A Lecture
ON
THE TREATMENT OF CANCER OF THE STOMACH.

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GENTLEMEN,—When it is realised how frequent gastric cancer is and that the disease is at first local and curable in a considerable proportion of cases by early removal, it is curious that the surgical treatment of this disease has not yet received more attention. The explanation of this anomaly can only be ignorance or prejudice, for clinical experts, both medical and surgical, in various parts of the world, have for some years not only been writing on the subject and trying to convince the profession and the public of the needs and the possibility of an early diagnosis with a view to successful radical treatment, but they have also clearly demonstrated the possibility of successfully practising what they have preached both with regard to diagnosis and treatment.

As regards the frequency of carcinoma of the stomach, Dr. C. N. Dowd [1] called attention to the fact that according to the census reports, there were no less than 9000 deaths from cancer of the stomach in the United States in 1900 and of these very few had been submitted to surgical treatment. I find on referring to the Registrar-General's report for England and Wales that during the years 1901–04 no less than 19,607 deaths from cancer of the stomach were registered, equal to 4901 per annum.

Our ignorance with regard to the possibility of an early diagnosis is partly true, for in 5 per cent. of cases the disease runs its course without any local signs, but if it were fully recognised that we have in exploratory incision the one diagnostic resource which is reliable in a considerable proportion of cases of incipient cancer this reproach might be put away. On this matter prejudice stands in the way, for although there may not be a difficulty in convincing a patient of the desirability of operation when a disease is positively diagnosed, for instance, when a tumour has made the diagnosis almost certain, yet when an operation is suggested as a means of diagnosis the patient is by no means so easily convinced of the desirability of accepting even a slight risk, especially if the medical attendant does not himself feel the absolute necessity of pressing the importance of the procedure. In blaming the public for the delay I think we are often unjust to their intelligence, for persons of ordinary intelligence can, as a rule, easily be made to understand that the waiting for a positive diagnosis means standing idly by until progressive involvement means hopeless extension of the disease.

Whenever a patient near or over 40 years of age complains of loss of appetite and other gastric symptoms, particularly pain and vomiting, followed by loss of flesh and strength, especially if associated with anæmia, and if the symptoms fail to yield in a short time to proper treatment, cancer of the stomach should be suspected, and if repeated examinations of the stomach contents after test meals show diminished digestive power and impaired motor function with possibly a diminution of free hydrochloric acid and the presence of lactic acid, an exploratory operation ought to be urged without delay in order to complete the diagnosis and if necessary to carry out curative treatment.

Laboratory methods.—The chemistry of the gastric secretion, the microscopic findings in the stomach contents, and the examination of the urine, fæces, and blood, all of which are of value in the later stages of the disease, must not have too great a weight attached to them in the earlier stages, nor must the clinician wait for the development of tumour or glandular enlargement before recommending exploratory incision.

[1] Medical Record, 1906.

Since cancer *per se* has no symptoms, it not infrequently happens that if the growth involves the body of the stomach and not the orifices, it may pursue its complete course without giving rise to any definite local symptoms and it has not infrequently happened that the cause has only been discovered at the necropsy. This form of latent cancer constitutes 5 per cent. of all cases according to Professor W. Osler, who also gives it as his opinion that 10 per cent. of all cases of cancer of the stomach run an extremely rapid course, terminating in death within three months.

In no less than 59·3 per cent. of cases of cancer of the stomach on which I have performed gastro-enterostomy for the relief of symptoms, the disease having advanced too far for gastrectomy, the long history of painful dyspepsia suggested the possibility of ulcer preceding the onset of malignant disease. W. J. Mayo, in 157 cases of cancer of the stomach, found a previous history of ulcer in 60 per cent. Cruveilhier discussed the cancerous transformation of ulcer of the stomach in 1839, but to Dittrich, writing in 1848, belongs the chief credit for drawing attention to the subject. He described in 160 cases of new growth six cases of cancer developing in the immediate vicinity of active or healed ulcers, two cases of the association of cancer and ulcer, and two cases in which the cancer was limited to a certain part of the margin of the ulcer, the rest remaining sound. Brinton in 1856 recognised the possibility of the grafting of cancer upon long-standing ulcer. Lebert in 1878 considered that the cancerous transformation occurred in 9 per cent. of ulcers but Zenker in 1882 expressed a strong opinion that all cases of cancer of the stomach were secondary to ulceration.

If these conclusions that ulcer is a predisposing cause of cancer are correct, and my experience tells me they are, then it is quite clear that we must in all cases in which an ulcer of the stomach resists treatment or its scar narrows the pylorus recommend an early gastro-enterostomy or excision of the ulcer in order to prevent the development of carcinoma. If a gastro enterostomy has been performed then the mechanical irritation by food of the ulcer in the pyloric region is reduced and the friction necessary to produce a carcinoma will probably not occur.

The origin of carcinoma in an ulcer of the stomach is only another instance added to many of which we have knowledge of the effect of persisting irritation in establishing malignant changes. Carcinoma occurs most frequently in those areas in which the ulcers chiefly lie. Whatever the frequency of the malignant change in chronic ulcer may prove to be the fact of its occurrence should be an additional incentive to the earlier surgical treatment of ulcers which prove rebellious.

Medical treatment may be considered in a few words; it cannot cure and can do very little even to prolong life; it therefore applies only to cases too advanced for surgical treatment or where operation is declined. It aims at nourishing the patient as much as possible and at relieving pain or other symptoms as they arise.

Surgical treatment offers the only chance of relief and the only possible chance of cure and in order that the best results may be attained the physician and surgeon must act in concert, so that by a timely diagnosis an operation may be undertaken at the earliest possible date. There is ample evidence to show that for some length of time cancer is a purely local disease; and, just as in the breast, the tongue, and the uterus we can point to patients living comfortably years after the removal of the disease, so in gastric cancer it is reasonable to assume, and in fact can now be proved by positive evidence, that a like result may be brought about. Here, however, we are faced with the difficulty of a sufficiently early diagnosis being made, and it is not only necessary for us to appeal for an early, exhaustive, and persistent investigation into suspicious stomach cases, but that when suspicion arises an early surgical consultation may be held, and, if needful, an exploratory operation carried out to complete the diagnosis. Let us remember, also, that to prolong the investigation uselessly and to wait until a tumour develops into a recognisable quantity, is to lose the favourable time for a radical operation; for although a clinical examination of the patient may give us strong grounds for suspicion, our diagnosis can only be rendered certain by a digital examination, which may be effected through a small incision that can, if needful, be made under cocaine anæsthesia with little, if any, risk. At the time of the exploratory procedure it will be generally advisable to have everything ready to follow it up by

whatever further operation may be called for. It may be discovered that the disease is manifestly not malignant and that no further operation is necessary, in which case the patient and his friends will be relieved of their anxieties. Or it may be found that some curative operation can be done, for instance, the removal of adhesions or the relief of obstruction. Or it may be discovered that the disease resembles malignancy both in its history and physical signs and in the form of the tumour, which on account of extent and adhesions and from the presence of enlarged glands it seems impracticable to remove with any hope of permanent success. The results of drainage by gastro-enterostomy in some of these cases, which at the time appeared beyond cure, are remarkable. The following is an example, one of many such cases on which I have operated and in which the patients were at the time of operation extremely ill and supposed to be suffering from cancer of the stomach but who, as the result of surgical treatment, are in good health years later.

The patient, a medical man, aged 31 years, had had dyspepsia for 17 years; this had been more severe during the last 20 months. 16 months previously vomiting began and from the outset large amounts were vomited but never contained blood. In December, 1897, the stomach reached to the pubes and visible peristalsis was present. Relief followed dieting and lavage until March, 1898, since which time the pain had been almost constant. A loss of weight had occurred from 10 stones to 8 stones 6½ pounds and the patient was extremely feeble. Operation was performed on May 6th, 1898, when a large irregular tumour was found at the pylorus and along the lesser curvature with extensive adhesions, but the glands, though large, were discrete. Gastro-jejunostomy was followed by relief of all symptoms. When the patient left the nursing home on June 7th his weight was 8 stones; on August 17th, 1898, it was 9 stones 3 pounds. The following is an extract from a letter from the patient, dated Feb. 12th, 1900: "My health continues perfect. I have not lost a day's work through illness since I recovered." He is in good health in 1906, eight years after operation.

I would lay particular stress on this class of cases, for I think it serves to explain some misconception about cancer generally. It would be easy for anyone to raise a claim to having cured a number of cases of cancer of the stomach by gastro-enterostomy, but I do not for a moment believe that any of these cases were more than inflammatory tumours formed around chronic gastric ulcers; nevertheless, I have no doubt that they would have proved fatal just as certainly as if they had been cancer had no operation been done. I feel sure that many such would have been certified as deaths from cancer of the stomach had no exploration been done or no necropsy and microscopic investigation made.

The cases also illustrate another point. Even though a tumour be present, and even though it be probably too large for removal, it may be quite worth while advocating an exploration, to be followed up by gastro-enterostomy if that be practicable, in the hope that the disease may prove to be wholly or partially inflammatory, which the physiological rest assured by gastro-enterostomy will either cure or materially relieve.

To pass to the genuine cancer cases, What can we do for them? This will depend (1) on the position of the growth; (2) on its extent; (3) on the presence of adhesions; and (4) on glandular invasion or secondary growths.

First as to position. In irremoveable growth at the cardiac end, if it involves the cardiac orifice and adjacent portion of the stomach, gastrostomy or jejunostomy should be performed in order that starvation may be staved off. The view that gastrostomy is both a dangerous and useless operation is, I know, held by some, but I feel convinced that such views are mistaken ones. When these cases, either of cancer of the cardiac end of the stomach or of the œsophagus, were handed over to the surgeon in a moribund condition the mortality of gastrostomy was, of course, terrible, and the short survival, even if successful from an operative point of view, made the procedure almost useless; but when one can point to a series of nearly 30 gastrostomies performed since 1897 with only a 5 per cent. mortality and great prolongation of life to many, there are good grounds for saying that the operation is well worth doing. The operation is quite a simple one and, if necessary, can be performed under cocaine anæsthesia in a very short time. In several cases the patients have lived a year or more and have gained considerably in weight, even up to 1½ stones and have lost their pain and the distressing sense of starvation.

The second class of cases to be considered is where the disease involves the pylorus and is producing obstruction to the passage onwards of the gastric contents, but where on account of extensive adhesions, secondary growths, or involvement of glands, it is considered unwise to attempt pylorectomy or partial gastrectomy, though there is sufficient free stomach wall left to enable a gastro-enterostomy to be performed. In such cases a gastro-enterostomy, if performed with proper expedition and adequate precautions, affords the greatest relief to the sufferer who not only loses the distress due to painful peristalsis and to the irritation of retained secretion but also becomes freed from the toxæmia due to absorption of the poisonous fermenting stomach contents which are drained away into the intestine and there disposed of. Thus life is prolonged and made more comfortable, flesh and colour are regained, and even in cases of cancer the patient may have a new lease of life.

The following cases are examples:—

CASE 1.—The patient, a man, aged 36 years, was seen on Oct. 26th, 1901. He suffered from manifest tumour of the stomach and had a history of stomach trouble extending over several years, with vomiting of blood and passage of melæna on two occasions within the preceding four months. At the operation a large tumour involving the duodenum and pyloric end of the stomach, too adherent for removal, was found and gastro-enterostomy was performed. After the operation he went abroad and for six months he rapidly gained weight and felt very well. He then began to get thinner and lose strength and without any pain he gradually became weaker and succumbed in September, 1902, 11 months after operation.

CASE 2.—The patient, a man, aged 63 years, had had symptoms for five years; at first those of chronic ulcer, later those of malignant ulcer with tumour associated with hæmatemesis. Gastro-enterostomy was performed on March 22nd, 1901. He made a good recovery and returned home at the end of the month, having gained about 4 pounds in weight during the fourth week. He ultimately gained about 2 stones and lived for a time in great comfort, but the growth progressed and he succumbed to exhaustion about a year later, having been able to enjoy life for some months.

CASE 3.—The patient, a man, aged 68 years, was operated upon on July 18th, 1902, for pyloric tumour with dilatation of the stomach. He was extremely feeble and suffering great pain. The disease appeared to be cancer and the glands were extensively involved, so that gastro-enterostomy only could be performed. A letter from Dr. S—— says that the patient gained 10 pounds up to November and is now 14 pounds heavier than before he fell ill. He is able to take regular exercise and has never felt any pain after taking any meal whatever since the operation. He was well over three years later.

In some cases where the condition of the patient and not simply the extent of the growth has prevented a radical operation, the speedy restoration to health enables a radical operation to be subsequently undertaken. The following case, out of others that could be cited, serves to illustrate what I mean. The patient, a man, aged 62 years, had had symptoms for a year. An epigastric tumour had been noticed for a month. There was no free hydrochloric acid in the vomit. An exploratory operation was performed on Nov. 15th, 1900. A ring of cancer was found forming an hour-glass-shaped stomach. The patient was too ill for gastrectomy. Posterior gastro-enterostomy was performed. A good recovery followed. On Dec. 20th, a month later, partial gastrectomy was performed, the ring of growth being removed and the cardiac and pyloric remnants of the stomach being fixed together over a large bone bobbin. A good recovery again resulted and the patient returned home within the month. He was quite well a year later. A letter was received from Dr G—— in November, 1902, in which it was stated that the patient had put on flesh, had gained colour, and had been able to take food well for over a year, but had succumbed to exhaustion from secondary growths in the omentum on March 30th, 1902, about 18 months after operation.

These examples will suffice to show the beneficial effects of gastro-enterostomy even in advanced cases of cancer of the stomach, for, as will be seen immediately, it is only in the cases too advanced for removal that the short-circuiting operation should be performed.

With regard to these patients the question may be asked, Is a palliative operation worth while? I have no hesitation in answering this decidedly in the affirmative, for in cases where cancer of the pylorus is obstructing the outlet of the stomach, the painful peristalsis, frequent vomiting, and inability to take food can all be relieved, and the remainder of life, months or years as the case may be, can be rendered not only tolerable but comfortable, for food can be taken in safety and enjoyed, the pain due to peristalsis disappears, the vomiting ceases, and the patient frequently puts on flesh considerably and is enabled to resume his duties, death ultimately occurring from exhaustion. The operation can be done with little risk, as including all my cases of posterior gastro-enterostomy performed during the past ten years the mortality is only 3·3 per cent., a great contrast to the death-rate of these cases a few years ago.

The third class of cases is of great interest and includes those where the disease is limited to the stomach and where the lymphatic glands and adjoining organs have not been seriously invaded, the patient being in a sufficiently good condition to permit of the radical operation being done. The following are examples.

CASE 1.—The patient, a woman, aged 50 years, had had symptoms for five months and a tumour had been noticed for three weeks. An operation was performed on Jan. 31st, 1901. The tumour was found to be involving the whole circumference of the pyloric end of the stomach, a short distance from the pylorus. After the growth had been widely excised the distal and proximal ends of the stomach were brought together over a large bone bobbin. The glands were excised from the lesser and also from the greater omentum. A smooth recovery followed. On Jan. 4th, 1903, two years later, her medical attendant wrote to tell me that the patient was remarkably well and that there was no sign of recurrence. She remained well until 1905, over four years, when there was recurrence of the disease.

CASE 2.—In the case of this patient, a woman, aged 54 years, there had been loss of flesh, and pain, with failing health for eight months, and slight jaundice and a tumour in the epigastrium and right hypochondrium for a shorter period. An operation was performed on August 9th, 1900. The gall-bladder, containing gall-stones and the site of a tumour, was removed. As the adjoining portion of the liver was involved a wedge-shaped partial hepatectomy was performed and as the pylorus was also the site of growth a partial gastrectomy including the pylorus was done, the cut section of the stomach being united to the duodenum by two continuous sutures over a bone bobbin. The removed tumour, examined microscopically after operation, proved to be cancer. That part of the abdominal wall to which the tumour had been adherent was also excised. The patient was reported to be well in 1905.

CASE 3.—The patient, a middle-aged man, who had been ailing for a year and had had stomach symptoms for three months and a noticeable tumour for six weeks, was supposed to be too ill and anæmic for operation, but as the tumour, which was situated in the left hypochondrium and epigastrium was freely moveable, I decided to operate. On May 23rd, 1902, I found a mass of cancer involving the centre of the stomach, which I removed along with some glands adjoining it. Recovery was uninterrupted. A letter dated Jan. 22nd, 1903, from his medical attendant contained the following statements: "Patient very well, has gained 14 pounds in weight. No evidence of return of growth. Able to transact his business." The patient lived until June, 1906, over four years after operation.

CASE 4.—In 1902[2] I reported a case *in extenso* where I had removed the whole of the stomach, except a small portion of the dome adjoining the œsophagus, for malignant disease, on March 18th, 1901. I am glad to say that this patient, over five years later, remains in absolutely good health; he has a good appetite, enjoys his food, and is able to attend to his business as usual.

These cases will be sufficient to show that removal of even a considerable portion of the stomach may be something more than a palliative operation; and I think it justifies me in saying that although it is better to have cases of cancer diagnosed and operated on early, yet we need not take the pessimistic view that if a tumour be manifest it is too late to perform a radical operation.

[2] Brit. Med. Jour., Nov. 8th, 1902.

The fourth class of cases is that in which the disease involves a great part or the whole of the stomach, the disease being irremoveable and gastro-enterostomy impracticable, and in which any attempt at taking food brings on pain and vomiting, so that the patient unless relieved must rapidly die in great distress; here a jejunostomy can be performed by a very simple and similar procedure to that of gastrostomy and through a Jaques catheter sufficient food can be given to ward off starvation and relieve the pain caused by attempts at taking food by the mouth. This operation can be done through the small exploratory incision and need involve very little longer time. It may prolong life for months or even for a year and make the end much easier and certainly less painful. I reported a case of jejunostomy in 1891 in which the patient lived three months, and in 1904 one by a new method that had lived, for 12 months after jejunostomy, and the fact of my case of almost complete gastrectomy being well five years after operation shows that the passage of food directly into the small intestine may be compatible with a comfortable life. Although the operation is rarely called for it is one nevertheless which should be borne in mind, as in an appropriate case it may confer a great boon upon the patient and render tolerable an otherwise comfortless existence.

No useful purpose can be served by comparing the results of gastrectomy with those of gastro-enterostomy for cancer, since the latter operation in malignant disease is reserved for late cases that have passed the stage when gastrectomy would have been a justifiable operation; nor do I consider that an estimate of the true value of gastrectomy can be attained by a consideration of the earlier cases operated on before the technique had been perfected. Up to the end of 1905 Kocher had performed 110 partial resections of the stomach, with a mortality of 24 per cent., but of the cases, 58 in number, operated on since 1898 the mortality was only 15 per cent., a percentage closely corresponding to that of the brothers Mayo, who up to the end of last year had performed 100 gastrectomies with a mortality of 14 per cent. In my own practice since 1896 the mortality for partial gastrectomy has been 16 per cent., and Maydl's statistics give also a 16 per cent. mortality. We may thus conclude that the immediate risks of partial gastrectomy as calculated from a considerable series of cases are between 14 and 16 per cent. Of the 27 cases of total gastrectomy collected from all sources by Mr. H. J. Paterson[3] ten patients died, a mortality of 36 per cent. Of the 20 cases of sub-total gastrectomy six patients died, a mortality of 30 per cent.

The remote results are equally interesting and not less important, not only from the point of freedom from recurrence but also as to the effect on the general health and comfort of the patient after the removal of the whole or part of the stomach. I have had under my notice for over five years a case of sub-total gastrectomy and from observations on this case it would seem as if the whole of the functions of the stomach could be replaced.

It would at first sight appear that as a reservoir the stomach could not be replaced, but the fact that a meal of moderate size can be taken shows that the upper end of the duodenum or the lower end of the œsophagus or both become dilated and serve that purpose, though perhaps to a limited extent. The mechanical functions of the stomach can be vicariously performed by the mouth aided by a careful selection of diet. The digestive functions of the stomach can be taken up by the pancreatic and the intestinal secretions and the absorption which normally occurs in the stomach can as easily take place in the small intestine. Pachon and Carvalho[4] have shown that dogs may gain in weight and remain in perfect health after removal of the entire stomach, and further observations on patients after complete gastrectomy, as in Schlatter's case, show that perfect health is compatible with an absence of the stomach.

Of the 27 total gastrectomies it is interesting to note that ten patients are living and well 8, 7, 5, 4½, 4, 3½, 2, and 1½ years, and two others at less periods, after operation, while others survived 3¾ years, 1¼ years, 13 months, 9 months, and 7 months respectively. With regard to sub-total gastrectomies, of the 14 patients who recovered from operation one was well 7½ years, one 6¼ years, and one 5¼ years after operation; while of the others one survived operation for 11 years and died from heart trouble without recurrence, one

[3] THE LANCET, March 3rd, 1906, p. 574.
[4] Comptes Rendus de la Société de Biologie, 1893, p. 794.

5 years, two 2½ years, two 1½ years, and one 1½ years respectively.

The immediate results of partial gastrectomy have been mentioned above and the final history has been obtained by Mr. Paterson in 55 of those that recovered. Of the 55 patients 35 have died since the operation; one died from recurrence seven years, and two five years later, but it is interesting to note that all the other patients in whom recurrence ensued died within 3½ years, so that if a patient remains free from recurrence for four or more years there would seem to be a strong probability of cure. Eight of the patients who died, lived over 3 years after operation and the average duration of life in cases where recurrence took place was just over 2 years. Of the patients who are apparently cured, one is alive and well 14 years, one 7½ years, two 6 years, one 5½ years, two 5 years, five over 3 years, and three over 2 years subsequent to operation, and one was living 4½ years after operation, but recurrence was feared. Thus nearly 14 per cent. of the patients who recovered from operation would seem to be cured or to have a reasonable prospect of remaining free from recurrence.

In conclusion, I hope I have advanced sufficient evidence to prove the following:—1. How desirable it is to make an early diagnosis of cancer of the stomach in order that a radical operation may be performed at the earliest possible moment. 2. That it may be needful to perform an exploratory operation in order to complete or confirm the diagnosis. 3. That such an exploration may be done with little or no risk in the early stages of the disease. 4. That even where the disease is more advanced and a tumour perceptible, an exploratory operation is, as a rule, still advisable in order to carry out radical or palliative treatment. 5. That where the disease is too extensive for any radical operation to be done, the palliative operation of gastro-enterostomy, which can be done with very small risk, may considerably prolong life and make the remainder of it much more comfortable and happy. 6. That some cases, thought at the time to be cancer, too extensive for removal, may after gastro-enterostomy clear up completely and get quite well. 7. That in cases of disease of the cardiac end of the stomach too extensive for removal, the operation of gastrostomy may considerably prolong life and prove of great comfort to the patient by preventing death from starvation. 8. That even where the disease is too extensive either for removal or for a gastro-enterostomy being performed with a fair chance of success, the operation of jejunostomy may prove of service to the patient. 9. That where a radical operation can be performed the thorough removal of the disease may bring about as much relief to the patient as does the operation for the removal of cancer in the breast, uterus, and other organs of the body, and that in some cases a complete cure may follow.

THE PUBLIC SUPPLY OF PURE OR SPECIALLY PREPARED MILK FOR THE FEEDING OF INFANTS.[1]

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AMONG the newer measures for the prevention of infantile mortality which have been increasingly adopted by sanitary authorities during the last few years the public supply of specially prepared infants' milk takes a prominent place. Since the first British Infants' Milk Depôt was established by the St. Helens corporation in 1899 the number of these institutions has steadily increased, and we are now in possession of a fund of information relating to their work which was not at the disposal of the earlier workers in this movement. My own experience of the practical working of a milk depôt during a period of nearly four years has led me to think that the methods upon which the British milk depôts are generally conducted might with advantage be modified and extended, and that the time has now arrived when the whole question of the public supply of infants' milk should be thoroughly reconsidered so that the infants' milk depôt might be allotted its proper place in our collective organisation for the protection of the public health.

[1] A paper read before the National Conference on Infantile Mortality.

The infants' milk depôt is a feature of the new preventive medicine, which is concerned not only with the hygiene of the environment but also with the hygiene of the person, and its object is to prevent the heavy infantile mortality due to defective infant feeding. Defective feeding is, of course, not the only cause of infantile mortality; there are many other conditions which have not yet received the attention their importance demands—such, for instance, as the conditions affecting the unborn child during the period of gestation. Still, we may regard defective feeding as the chief cause of infantile mortality and it is certainly the cause which has of late years received the most attention from sanitary authorities. In most towns a municipal leaflet on infant feeding forms part of the circulating literature of the district, and usually the directions in such advisory leaflets are supplemented by the oral instruction of health visitors. The infants' milk depôt should not, then, be regarded as marking a new departure in our methods of public hygiene. It is rather an extension of the system of municipal direction of infant feeding which was at work years before the first milk depôt opened its doors in the last year but one of the nineteenth century. Nor should the work of a milk depôt be looked upon as limited to the handing of bottled, modified, and more or less sterilised milk over a municipal counter. The main function of the infants' milk depôt is to serve as the nucleus of an organisation for the feeding of infants under municipal direction and supervision. This is the point I wish to emphasise in the following remarks.

The infantile mortality dependent upon defective infant feeding is, broadly speaking, a mortality of hand-fed infants.—If all babies could be secured an adequate supply of mothers' milk during the first 12 months or the first nine months, or even the first six months, of life our mortality tables would present a very different appearance. Fortunately there is reason to think that in most towns at all events breast-fed babies are still in a majority. Hand-fed infants form, as Dr. J. F. J. Sykes has pointed out, a residuum; but the important point to remember is that it is this residuum that afflicts us with the enormous mortality from diarrhœa and malnutrition against which our preventive methods are chiefly directed. There are two ways of dealing with this residuum of hand-fed infants. One is to promote breast-feeding, so as to reduce the residuum to the smallest possible dimensions; the other is to improve the artificial food supplied to the hand-fed infants, so that their hand-feeding may do them as little harm as possible. Broadly speaking, it may be said that while the encouragement of breast-feeding is the chief feature of the French methods of preventing infantile mortality, we in this country have devoted ourselves mainly to the improvement of artificial feeding. The infants' milk depôt may be made a means to promote both these objects if it be conducted somewhat on the following lines.

In the first place, it is important that the milk should never be supplied in such a way as to run the risk of discouraging breast-feeding. Care should be taken to admit to the depôt only those infants for whom satisfactory breast-feeding is impossible to secure. During the last year I was connected with the Battersea depôt the milk was not supplied for an infant under nine months unless the mother could satisfy me, by the production of a written recommendation from a medical man or otherwise, that she was unable to suckle her child. In this way I was able to persuade a number of mothers, who would otherwise have prematurely weaned their babies, to continue to suckle. In some cases, where it was impossible for the child to be wholly breast-fed, partial breast-feeding was secured, the mother's milk being supplemented by a supply of cows' milk from the depôt. In all cases, however, the applicants were repeatedly assured that the depôt milk, like all artificial foods, was but a poor substitute for mother's milk. I would urge the importance of taking precautions of this kind. If the milk is supplied to all applicants without discrimination we lay ourselves open to the charge that we discourage breast-feeding and are therefore guilty of *lèse maternité*.

Secondly, the infants should be under periodical medical supervision. In the French institution, the goutte de lait, from which our milk depôts are derived, the chief feature of the work is not by any means the distribution of the milk but the systematic weighing and medical supervision of the infants. Every week the baby is brought to the depôt, where it is weighed and examined by the medical director of the institution. Most of the British milk depôts lack this direct medical supervision, but a certain amount of indirect

supervision is secured by the domiciliary visitation by lady inspectors and health visitors, acting under the instructions of the medical officer of health. This domiciliary visitation is very valuable work. The mother can be influenced and instructed with more effect in her own home than anywhere else. In the work of the Glasgow depôts, however, the advantages of both methods are combined. Within the last few months the corporation of Glasgow has appointed a lady doctor to visit the homes of the infants fed from the municipal milk depôt and to weigh the babies and to supervise their progress generally. This appointment is a valuable and significant development of the work of the infants' milk depôt. It marks a new departure in preventive medicine by bringing medical women into the practical work of public health administration. Public health work is work for which women doctors are especially well fitted, and it is to be hoped that the number of medical women employed in such work will be much increased in the future. I should say, however, that Glasgow is not the first town to enlist the services of medical women in the prevention of infantile mortality; that honour belongs, I believe, to Huddersfield. There is no reason, however, why the advantages of this systematic medical supervision (including weighing) need be restricted to the babies fed on the depôt milk. Nursing mothers should also be encouraged to bring their babies to the depôt to be weighed and supervised. In this way it would be possible to secure a continuance of breast-feeding for many infants who are now prematurely weaned. Many women give up suckling, and deliver up their babies to the bottle on the advice of ignorant friends or relatives because their milk appears to disagree with the baby. In such cases what is wanted is not the premature weaning which now too often occurs, but a skilled regulation of the mother's diet and mode of life so as to make the milk more suited to the baby's needs. This could be insured by a system of municipal supervision of sucklings. I see many possibilities in the system of municipal supervision of infant-feeding which has been developed by the milk depôts. We have heard a good deal lately about the medical inspection of school children but the medical inspection of infants is equally important and necessary. At the present time many mothers do not seek medical advice on child-rearing until the child is already ill, often so ill as to be beyond the hope of recovery. It would be far better that such advice should be given to her while the child is still healthy. I have no doubt that the medical supervision of infant-feeding by municipal medical men for the purpose not of curing but of preventing disease, will become an important feature in our system of State medicine. We are awaking to the realisation that every baby born to us is a national asset, and sound national policy no less than humanitarian feeling dictates that no effort should be spared to secure the physical efficiency of those to whom will be committed the future of our country.

There is another way in which the practice of the British milk depôts might be improved. In all our depôts, so far as I am aware, the milk is either sterilised or pasteurised; and without entering upon a discussion as to disadvantages of sterilised milk, which I think have been greatly exaggerated, we must all admit that it would be better to supply the milk pure and uncooked if it could be done. All methods of milk purification having for their object the neutralisation of existing pollution, such methods as sterilisation, pasteurisation, centrifugalisation, or filtration, we must regard as makeshifts, to be abandoned when better methods of milk production become practicable. Is it possible by strict veterinary supervision, combined with aseptic methods of milk production, the employment of bottles, and the free use of cold storage, to supply raw cows' milk to infants with impunity? The experience of the Municipal Infants Milk Depôt at Rochester, U.S.A., where such methods have been in operation for the past seven years, shows that it is quite possible to do this provided that the complete control of the processes of production, from the care of the cows onwards, is in the hands of the responsible officers of the municipality. The municipal cow is a necessary complement of the municipal milk depôt. If the methods of clean milk production which have been employed with such success at Rochester were adopted in the British depôts not only would the quality of the milk supplied be greatly improved but an object-lesson of great value could be given to the dairy farmer. An ounce of example is worth a ton of precept. One model municipal dairy farm managed on scientific methods would do more to promote the production of pure milk than any number of reports and papers on the question of the milk-supply.

In conclusion, I would again urge that the infants' milk depôt is very much more than a municipal milk-shop—a place where municipal milk is handed out to anyone who chooses to ask for it. It is, or at all events it should be, (1) an important educational influence, a school of infant feeding, the centre of a system of municipal supervision of infant feeding; (2) the source of a pure milk-supply; and (3) an object-lesson in the production of pure milk. It is by the attainment of these objects that the infants' milk depôt will achieve its justification, its permanent place in our system of preventive medicine, and its ultimate success.

Hampstead.

INFANTILE MORTALITY AND THE EMPLOYMENT OF MARRIED WOMEN IN FACTORY LABOUR BEFORE AND AFTER CONFINEMENT.[1]

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THERE is no need to emphasise the importance of that phase of the infantile mortality question the discussion on which I have the honour to introduce; neither, before an audience such as this, is it necessary to occupy much time in proving what must be patent to all who have studied the question. Endless proof is available of the injury to infant life arising from the unrestricted practice of mothers engaging in factory labour, but, as it happens that I have had somewhat exceptional opportunities of gauging the effect of this practice in a large manufacturing county, a short account of certain special inquiries I have made regarding the question may be of some interest.

The artisan population of Staffordshire is grouped together in two large centres in the extreme north and south of the county, the intervening area being rural in character. From the point of view of health conditions the two grouped populations, north and south, may be said to be identical and in both cases the general influences which operate in causing a high infantile mortality prevail largely and to an equal extent. In one respect, however, there is a marked difference in the two populations arising from the special industries carried on in the two centres, the workers in the north being mostly potters while those in the south are miners and iron workers; therefore in the north a very large number of women, both married and single, are engaged in factory labour, whereas in the south the trades carried on afford practically no employment for women.

Some 16 years ago, when my public health work in Staffordshire began, I was very much struck with the great excess in the infantile mortality-rates of the northern artisan towns compared with those of the southern towns, high though the latter were; and this led me to make special inquiry into the question, with the result that the dissimilarity could not be accounted for by any apparent difference in the general sanitary surroundings of the two populations. The conclusion then presented itself that in the married woman labour question the key to the situation might be found. With the view of more stringently testing the accuracy of this hypothesis the towns, irrespective of geographical position in the county, were as far as possible specially classified into three groups according to the proportion of married women workers in each, with the result that the infant mortality-rates were found to vary in direct proportion to the number of such workers. From year to year since then these figures have similarly been classified, and the results have unfailingly, and in a very marked manner, supported the conclusion originally arrived at. Whether, from the operation of other causes, the general infantile mortality happened to be high or low from year to year, practically the same proportionate increase or decrease, as the case may be, in the three groups of towns was maintained.

In classifying the towns into groups in the first instance I obtained the necessary information as to the relative number of married women workers from district medical officers of health and manufacturers, but, while all care was taken to insure accuracy, in the absence of any available figures the

[1] A paper read before the National Conference on Infantile Mortality.

classification was merely approximately correct. In 1902, however, the Registrar-General was good enough to supply me with certain figures, specially extracted from the 1901 census returns, showing the number of married and widowed females engaged in specified occupations in each of the towns in question, together with the number of females living at various ages. From these figures I estimated, in the case of each artisan town, the percentage of married and widowed females engaged in work involving absence from home during the day per total females between the ages of 18 to 50 years, but I had no data to allow of the number of married as distinct from widowed females being arrived at. Also, in order to make use of the Staffordshire infantile mortality returns which were available for 24 years I was obliged to assume that the number of married and widowed out-workers to the female population within the specified age limit was the same throughout the whole period as in the last census year, an assumption which, I think, is justified by the fact that no change has taken place in the special trades carried on in the various towns during that period.

On the new basis I have reclassified the towns (artisan only) into three groups, placing in the first group those in which the proportion of married and widowed females engaged in work away from home to total females between 18 and 50 reached, and exceeded, 12 per cent., in the second group those towns in which the proportion was under 12 per cent. and over 6 per cent., and in the third group those in which the proportion was under 6 per cent.

In the following table the rates in the different groups of towns are given.

Class according to percentage of married and widowed workers to female population between the ages of 18 and 50 years.	Number of towns.	Total population, 1901 census.	Deaths of infants under one year per 1000 registered births.		
			1881 to 1890.	1891 to 1900.	1901 to 1904.
I.—12 per cent. and over	5	132,299	195	212	193
II.—Under 12 per cent. and over 6 per cent.	13	263,868	165	175	156
III.—Under 6 per cent.	8	131,508	156	163	149

As a matter of fact, the more accurate method of classifying the towns as compared with the classification previously adopted has not caused any appreciable alteration in the relative mortality in the three groups, and I submit that the figures bear out my contention that, in the absence of any other apparent reason, the excessive mortality in the first group compared with the second and third, and in the second compared with the third is attributable to the nature of the trades carried on as affecting the facilities for the employment of women away from home, and as a consequence the proportion of wholly artificially fed to entirely or partially breast-fed infants.

There is another aspect of the question, however, apart from that which more directly results from mothers neglecting their home duties after their children are born, and that is the effect, as regards the viability of the unborn, of mothers engaging in other than domestic work up to the time of their confinements. While all must realise how undesirable this practice is, the extent of the injury directly attributable to it cannot very readily be demonstrated by figures. In time, however, I think we shall have data available in connexion with the administration of the Midwives Act which may throw some light on the question. This Act has only been in practical operation for a little over 12 months and it has taken some time to get the machinery into efficient working order; nevertheless, through the energy of two inspectors working under the Act in Staffordshire I am able, even at this early date, to submit certain figures which, having regard to the difference between the north and the south in the matter of women employment, are very significant. Under the rules of the Central Midwives' Board certificated midwives attending abnormal cases have to call in medical assistance and notify the fact to the local supervising authority and they have also to notify all stillbirths occurring in their practice. This being the case, allowing that working in a factory up to the date of her confinement is detrimental to the mother, one would expect, other things being equal, that the abnormalities and the stillbirths in the pottery towns would exceed those in other artisan towns where the nature of the work does not afford employment for women. For the purpose of inspection under the Act the county is divided into northern and southern areas, the former comprising the populous pottery towns and the latter the equally populous towns inhabited by miners and iron workers. Up to the present time the following are the relative figures for the two areas as regards notifications received of (*a*) abnormalities and (*b*) stillbirths in the practice of registered midwives per 1000 births registered:—

	Abnormalities.	Stillbirths.
North	15·0	9·4
South	6·0	3·2

The figures appear small in both cases, but it must be remembered that the rates are calculated upon the total births, whereas only a proportion of these were attended by registered midwives, many having been attended by medical men, or by unregistered midwives, who are not yet entirely barred from work. It is also important to note that, although the records cover a period of 12 months, the number of notifications sent in was much smaller than it should have been owing to ignorance on the part of the midwives in the first instance regarding the rules to be observed. Again, included in the areas covered by the returns in this case are the rural districts and one or two small non-artisan towns. All these disturbing circumstances, however, are equally operative in both areas, and the figures, so far as they represent the position, may be said to be comparable. When the Act has been longer in operation and the midwives become better informed regarding the rules the number of notifications sent in will no doubt greatly increase and I also hope in time to obtain further and more exact data for comparison.

So much for the effect of the practice of married women working in factories upon the infantile mortality. I would point out, however, that the damage done cannot entirely be measured by mortality figures, for these take no account of the impaired vitality of the infants who manage to survive to swell the ranks of the degenerate.

If, then, the injury is as great as we believe it to be—and this can hardly be disputed having regard to the evidence adduced in endless official reports as well as the findings of special commissions—one is inclined to ask, Why should it still be necessary to agitate for the adoption of remedial measures? Surely public opinion is now sufficiently ripe for legislative interference, especially in view of the fact that the State already concerns itself regarding the conditions of employment in trades which are detrimental to the health of the workers. But if humanitarian arguments alone do not afford sufficient incentive for action will not the less unselfish desire to counteract the effect of the diminishing birth-rate serve as a more potent argument having regard to national prosperity? But, convinced though we may be of the need for State interference, to make a practical suggestion regarding the form it shall take is for many reasons by no means easy. Clearly the efficient remedy would be to prevent married women from working in factories or away from home unless they are in a position to show that necessity compels them to do so. Such a claim would with reason frequently be advanced, but I am confident that in the majority of cases there is no real need for married women at the child-bearing age to engage in work away from home, and, if this be so, enforced restraint would merely result in a smaller sum per week being available for the husbands' indulgence, a result which in itself is much to be desired. In this, as in most matters, however, we shall probably have to be satisfied in the first instance with less than we know to be desirable. The restriction now imposed by law of one month's abstention from work after her confinement is advantageous to the mother but it does not materially benefit the child. If, however, the restriction extended to three months the probability is that the mother would suckle her child during that time and thus the most precarious period of the infant's life would be tided over and the chances of subsequent survival would be considerably enhanced. How to prevent mothers from working previously to their confinement is a more difficult matter and to attempt to enforce any specific restrictions would, for obvious reasons, be found to be impracticable. On the other hand, there is no reason why the need should not be recognised and provided for, it being left to the factory medical officer to determine the time in each case when pregnant women shall give up work.

Stafford.

THE INCREASE OF THE POWER OF LOCAL AUTHORITIES WITH REGARD TO MILK-SUPPLY.[1]

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THE object of this discussion is to consider what alteration in existing legislation seems to be necessary to enable local authorities to insure the provision of a pure milk-supply. At present milk-supplies are controlled by the Dairies, Cowsheds, and Milk Shops Order and by certain clauses in the Public Health and Sale of Food and Drugs Acts. These are of general application but the last named, as applied, has usually reference to variation in the normal constituents of milk present in a particular sample, while the clauses of the Public Health Acts aim at preventing the sale of milk which has, or is likely to, become infected. In addition several larger towns in England possess further powers on the lines of the Manchester milk clauses. These deal with specifically infected milk and their object is therefore akin to that of the clauses of the Public Health Act. They refer to tuberculosis of the udder; and in Scotland there are the somewhat parallel provisions in certain adoptive clauses of the Burgh Police Act, 1903. It is therefore solely through the provisions of the Dairies Order that local authorities are enabled to deal with the sanitary condition of milk premises and to take such steps as seem likely to prevent the infection or contamination of milk.

It is unnecessary here to consider in any detail how the above purposes are to be accomplished. It is sufficient to note that in general their aim is to secure the health of the stalled animals and cleanliness in the production and distribution of milk. Certain structural and sanitary requirements must be observed and a prohibition is placed on the handling of milk by persons suffering from infectious disease. Contamination, so far as it is likely to arise from structural defect in the premises, is to be prevented; and the milk of animals suffering from certain diseases is to be withheld from sale. Chiefly, however, the Order places in the hands of local authorities power to frame regulations for controlling the conditions under which milk is produced and sold within their several districts. Everything therefore which tends towards stringency in the form, or efficiency in the application, of these regulations depends on the view taken by a local authority of its responsibility. Some make considerable effort, others are satisfied with a less exacting standard; in others the power to regulate has been left in abeyance.

Through the courtesy of the Local Government Board for Scotland I am able to introduce here a statement of the number of local authorities who have there availed themselves of this power:—

Information as to the Number of Local Authorities that have adopted Dairy Regulations in Scotland.

Local authorities.	Landward.	Burghal.	Total.
Number of local authorities in Scotland	107	205	312
Number of local authorities that had regulations in force *prior* to the coming into operation of the Dairies Order, 1899	79*	87†	166§
Number of local authorities that have adopted regulations *subsequently* to the coming into operation of the 1899 Order	3	52	55
Total number of local authorities that have dairy regulations presently in force	82	139	221

* Of these seven revised their regulations after the coming into operation of the Order of 1899.
† Of these 14 revised their regulations after the coming into operation of the Order of 1899.
§ Of these 21 revised their regulations after the coming into operation of the Order of 1899.

[1] A paper read before the National Conference on Infantile Mortality.

Mr. Power, principal medical officer of the English Local Government Board, has informed me that of 1134 urban district councils in England and Wales 804 (approximately) have adopted the regulations, while of 657 rural district councils about 364 have done so.

Limited scope of present regulations.—A moment's reflection on the history of dairy legislation will make it clear why, despite all our provisions, there should still be a demand for increased power of control. In point of time the conception that disease might be spread by water anticipated by a few years the parallel conception that it might also be spread by milk. And as the diseases which afforded the earlier illustrations in both cases were of the major epidemic sort our dairy legislation was devised against disease in the concrete and on the assumption that the evidence of its presence was written in characters which could not be mistaken. So that when the Dairies Order prohibited anyone sick of an infectious disease from handling milk it had in view the dairyman's family and the more obvious risks arising from the storing of milk in vessels kept in a living apartment; the cleansing of milk vessels in a polluted water-supply, or the alternate use of the milk scullery as a domestic washing-house. And as with diseases of the dairyman, so it was with diseases of the dairy stock. Cattle plague, pleuro-pneumonia, and foot-and-mouth disease represented until quite lately the only diseases of cattle which debarred their milk from sale for human food, and although tuberculosis of the udder has now been added, we do violence to our knowledge of the laws both of physiology and of disease by assuming that any form of acute febrile disease in a milk animal other than these named is without pathological significance or can fail to influence the character of the milk yield while the disease continues. For example, septic and acute gastro-intestinal affections in animals, non-tuberculous affections of the udder, teat eruptions, &c., have still no place in dairy legislation, although all of them have at one time or another been demonstrably associated with disease in the milk consumer.

All this notwithstanding, it is not my intention to suggest that dairy legislation has failed to accomplish considerable reform where local authorities have been disposed to make use of their powers. But during the years since the Order was framed the whole pathology of dirt has acquired a new significance and its bearing on the causation of disease has rapidly outstripped our legal phraseology. Justice, indeed, requires us to admit that local authorities have as a rule failed to make useful application of this knowledge; and it is to some of the larger milk companies in this country and abroad that we must go for illustration of successful application, to the technique of the dairy, of the teachings of the research laboratory. For while administrative effort has almost too exclusively confined itself to producing reform in the structural environment of the milk-supply and only in the actual presence of disease has concerned itself to any great extent with the habits of the milker, commercial companies have shown us that the hygienics of the milk question depend quite as much on intelligent handling of the milk at, and after, production. It is the application of the surgeon's conception of cleanliness to the conditions of the milk traffic which these companies have taught local authorities; it is the adoption of measures to prevent contamination in a sense very different from that which obtained when the Dairies Order was framed which is so desirable—so necessary in fact; and it is this which I venture to suggest is impossible of attainment through the operation of any regulations which the present Dairies Order enables us to make. By these channels we have reached the conception of a pure milk-supply, free not only from the germs of specific disease obtained from the animal or its attendant but also from those other elements of contamination which lurk in the dust of byres and in every milking pail, milk churn, and dish through which the milk passes on its way to the consumer. I do not forget that it has been argued that the greater contamination of milk only occurs after it has reached the household of the consumer, but as evidence that the purveyor does not accept this as a satisfactory explanation of all the impurity we have only to remember the widespread use of chemical preservatives and the rapid growth in recent years of the practice of commercial pasteurisation. Both have one aim, and both, moreover, by implication range the purveyor among those who affirm that milk requiring either has been produced under conditions which are not satisfactory.

The need for extension of the Dairies Order.—It is pertinent to ask why local authorities have failed to bring administrative requirements into line with this advancing knowledge of the sources of milk contamination. Of recent years the question of tubercle in dairy herds has almost excluded from view other important phases of dairy legislation. It explains also, I think, the inaction which we are here considering, for the Dairies Order is defective and the local authorities are inactive, not because of unwillingness, but from inability to accomplish what is so necessary. In particular the Order is too restricted in its definition of disease as affecting animals and fails probably most of all in the optional character of the provision contained in its Article 13 enabling local authorities to regulate the conditions of the milk traffic. Moreover, the scope of the regulations is limited and does not include the food or toilette of the animal or provide for the withdrawal from sale for food of milk obtained from animals undergoing treatment by drugs which are known to affect prejudicially the character of the milk. I suggest to you, therefore, that in any new Dairies Order disease in animals should, for the purposes of the present Article 15, include every general disease accompanied by fever, all acute affections of the gastro-intestinal tract, and inflammatory affections of the udder and teats.

Regarding teat eruptions there is, I think, evidence to suggest that even a superficial sore may add to the milk not only the morbid products common to all diseased surfaces but may afford a suitable culture field for bacillary growths with pathogenic properties; and I have before me notes of a recent series of sore throats presenting all the clinical features of diphtheria and occurring contemporaneously with the presence of such sores as I have indicated, from which an organism was recovered by culture which failed only in the final test of virulence to animals.

Notification by the cowkeeper of disease among his herd has its advocates, but the almost universal neglect of the parallel obligation imposed on the householder under the Infectious Disease (Notification) Act does not suggest that notification by the cowkeeper would be better observed. The more hopeful method would seem to be frequency of inspection followed by a penalty on conviction of any contravention of the regulations and the destruction of the animal when suffering from any infectious disease likely to affect its milk permanently. But it may be asked whether regulations of the character we are now considering are likely to insure a milk-supply which will reach the consumer in a fresh and wholesome state.

The technique of the modern dairy includes filtering and cooling, sometimes bottling and sterilising, and it is suggested that milk treated efficiently by either method can only be supplied at a prohibitive price. This can be true only so long as a fractional portion of the supply is so treated. Extend the demand for it and by coöperation the economic difficulties of the milk producers on a small scale will disappear. And the way to extend the demand is by the creation of an educated public opinion which this Conference will, we hope, do something to further. But more would seem to be necessary. Administratively the principle of empowering one local authority to interpose between another local authority and its responsibilities is, I think, objectionable and only excusable on the plea of hopeless remissness. There can be no doubt, moreover, that the consumer of the milk is the more likely to have his critical faculty highly developed and hence regulations and customs deemed satisfactory by a rural authority may quite reasonably fail to gain acceptance in a neighbouring town. If, then, the larger neighbours are to maintain a policy of non-interference, are they to remain inactive?

Is it not the case that knowledge regarding the dust impurities in milk is steadily pointing in the direction of a bacterial standard of purity, that some organisms are inoffensive, while others are highly offensive in origin, and that in some countries summary destruction follows the discovery of any milk found on sale at a temperature exceeding a given maximum? I suggest to you that regulations of this character would form a most efficient stimulus to reform in dairy methods. On such lines we must, I think, ultimately reach the provision of a pure milk-supply, but meanwhile voluntary action on the part of local authorities would accomplish much.

We have before us illustration of the success which has attended a system of certifying milk produced and distributed under rigidly hygienic conditions, and were the local authorities of the large towns in this country to agree upon voluntary registration of such dairies as observed similar precautions, and to issue certificates which would form a guarantee of the character of the milk we should have begun to level up the standard of our milk-supplies.

I have said nothing regarding the difficulty which certain corporations have experienced in financing infants' milk depôts. In Scotland this difficulty has not been felt, and although the Milk Depôts (London) Bill of last year, which would have legalised the establishment of milk depôts by the metropolitan boroughs, was dropped, the principle has, I believe, been embodied in the Borough of Woolwich Act of this year.

The sediment in milk.—As illustration of the impurity, which it should be the object of regulations to prevent, I submit a statement prepared by Dr. R. M. Buchanan, bacteriologist to the corporation of Glasgow, of the microscopic and bacterial characteristics of some sediment which I caused to be obtained from milk produced on farms where considerable effort is made to conform with existing regulations. This fact explains, I think, the relative smallness of the volume of sediment recovered, although it scarcely affects its character. It is our practice in Glasgow to pass all the milk supplied to the Infant Milk Depôt through an electrically driven separator and the sediment of 150 gallons was examined on several successive days. Dr. Buchanan's description is as follows:—

The five deposits submitted consist of repulsive pultaceous masses, composed of greyish dung-like material, interspersed with hairs, and covered with dirty greyish slime. Two of the samples selected for detailed examination presented the following appearances.

Microscopical examination.—(*a*) Greyish dung-like material showed many dust-like particles of an indefinite nature black, yellow, and brown; fragments of vegetable fibres—a few colourless but majority yellowish-brown and some apparently partly digested; some semi-crystalline translucent masses varying in size; squamous epithelial cells in large number; leucocytes a few; fat globules a few; and hairs a few. (*b*) *Dirty greyish slime.*—Consisted mainly of leucocytes; numerous fat globules and fatty particles; squamous epithelial cells were abundant but scarcely any dust particles or vegetable fibres were detected. Bacteria numerous as compared with the number in the greyish material and comprised cocci, short bacilli, and a few streptococci.

Bacteriological Examination.

—	Deposit of May 29th, 1906.	Deposit of May 31st, 1906.
Bacterial content	Estimated at 145,080,000 per gramme.	Estimated at 142,200,000 per gramme.
Bacillus enteritidis sporogenes.	Absent in 1 milligramme	Absent in 1 milligramme.
Bacillus coli.	Absent in 1 milligramme.	Absent in 1 milligramme.
Coliform bacilli (bacillus lactis aerogenes type).	Estimated at 2,520,000 per gramme.	Estimated at 420,000 per gramme.

This sediment on being weighed by Mr. Harris, corporation chemist, was found to average 135 grammes, or 4·76 ounces when moist, whilst on drying at 100° C. it was reduced to 3·01 ounces. This represents over the total volume of milk an average of 8·8 grains of dried material per gallon, or rather more than one and a half grains per pint.

Glasgow.

THE STERILISATION OF TUBERCULOUS SPUTUM AND ARTICLES INFECTED BY THE TUBERCLE BACILLUS.

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UNTIL the year 1905 it was the custom at Brompton Hospital to destroy all sputum in a cremator. The cups in which the sputum was collected were washed by hand and sterilised. The patients were supplied daily with new handkerchiefs which after use were burnt. These methods seemed undesirable to the medical staff for the following reasons: (1) the risk of infection to those employed in sterilising, &c. (2) the considerable expense entailed in

keeping the cremator in repair; and (3) the cost of special handkerchiefs. We were therefore asked to devise a scheme by which these objections might be overcome.

Turning our attention first to the question of the sterilisation of the sputum we decided that it would be advisable, if possible, to abolish the cremator and to substitute a receptacle in which the sputum would be sterilised by the action of steam at a temperature of 250° F. Before this method could be advised it was necessary to determine what the action of the steam on the sputum would be, as if it had the effect of coagulating the sputum the portions thus coagulated might escape sterilisation, and further, such unsterilised coagulated particles of sputum might adhere to the sides of the apparatus and thus become a source of infection. In order to test the matter we experimented on sputum placed in a small iron vessel under the pressure necessary to keep the steam at the required temperature and found that the sputum, so far from coagulating, tended to become more liquid the higher the temperature, and, moreover, did not adhere to the sides of the apparatus. The sputum so treated was afterwards injected into guinea pigs and as the result of three independent observations it was found that the guinea-pigs so inoculated were not infected with tuberculosis, whereas control animals injected with unsterilised sputum in all cases developed the disease.

Upon the evidence of these experiments the committee of management decided to have two steam sterilisers constructed of the capacity of 20 gallons and they have now been in use for 14 months.

The sputum treated in these sterilisers has been tested by Mr. L. S. Dudgeon with the following results:

I.—*Control animals.*—Two guinea-pigs were injected. They were killed at the end of seven days. Post mortem they showed tuberculous abscesses at the seats of inoculation and local glands. Tubercle bacilli were present in the pus and in the glands. Two guinea-pigs were injected and were killed at the end of 14 days. Result: There was general tuberculosis of the viscera below the diaphragm and of all the glands on the injected side. Tubercle bacilli were present in the glands. In each of the following two guinea-pigs were injected.

II.—Sputum raised to 250° F. Result: No tuberculosis at the end of five weeks.

III.—Sputum raised to 212° F. for 20 minutes. Result similar to II.

IV.—Sputum raised to boiling point for ten minutes. Result similar to II.

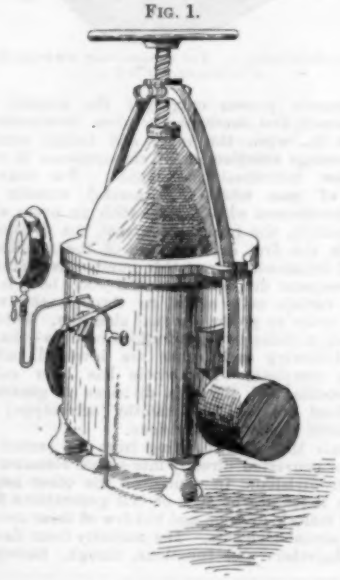
V.—Sputum raised to boiling point for five minutes. Result similar to II.

VI.—Sputum raised to 200° F. Result similar to II.

Therefore in no case did any of the guinea-pigs other than the controls develop tuberculous foci.

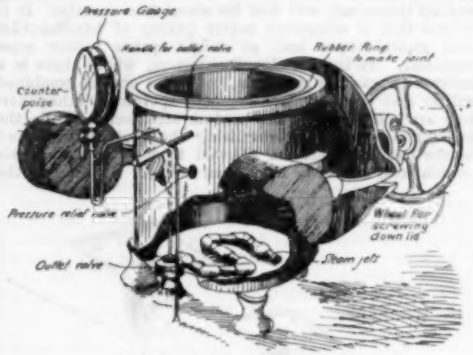
Each steriliser consists of an iron vessel with a moveable lid (Figs. 1 and 2), having at the bottom two steam jets so arranged that a circular motion is given to the contents. The sputum having been poured into the vessel the lid is screwed down and steam is allowed to enter until a pressure of 15 pounds (corresponding to a temperature of 250° F.) has been obtained. The contained sputum is allowed to boil under the action of steam for a period of 20 minutes, after which it is allowed to cool to a temperature somewhat above 100° F. and is emptied into the drain by opening a valve in the bottom of the steriliser, arranged so that all the contents can drain away.

FIG. 1.



Sputum steriliser with cover on.

FIG. 2.



Sputum steriliser with cover off.

Method of cleansing the sputum pots.—The sputum pots, as has been stated, were formerly cleansed by hand. Each pot was separately washed by the man appointed for this duty, who for the sake of cleanliness and the avoidance of infection was provided with an apron, gloves, and boots of india-rubber which after use were sterilised. This procedure not only took considerable time but subjected those employed to the risk of infection if they were at all careless. Upon our suggestion and as a means of overcoming these objections the following method of sterilising sputum pots was proposed and adopted.

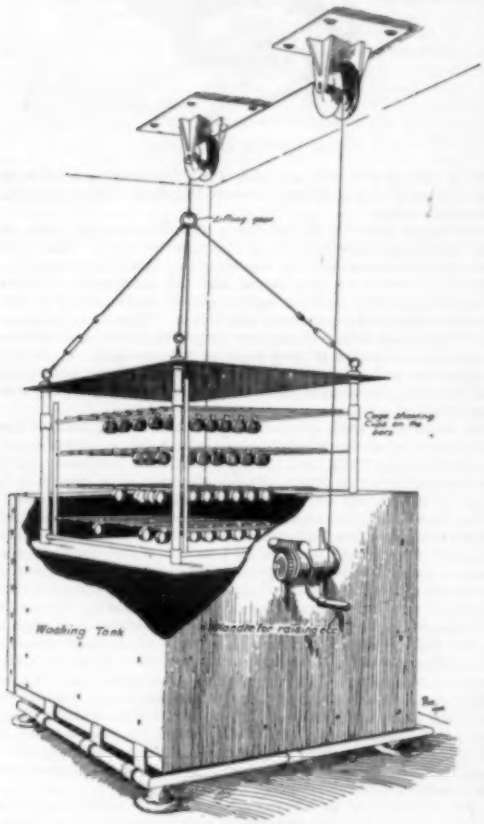
A large iron tank (Fig. 3) was constructed, having the necessary valves for admitting water and steam and a valve in the bottom of the tank through which the contents could be emptied into the drain. Inside the tank is a cage which can be raised out of, or lowered into, the tank at will. This cage is constructed of brass tubes framed and braced together. On the horizontal tubes the sputum cups are suspended by their handles and the covers of the cups are placed in suitable trays provided in the cage. For the purposes of sterilisation and cleaning, the cage full of soiled sputum cups and covers is lowered into the tank. Water is admitted into the tank and boiled by the admission of steam. After boiling for 20 minutes this water is emptied and the process is repeated. The cage is then raised and the cups and covers are removed. By this method much less handling of the cups is required and the cleaning of both cups and covers is found to be more thoroughly performed than when washed by hand. The saving of time effected by this method of washing the cups enables the same staff as was formerly employed in collecting and washing the cups to wash the handkerchiefs in addition.

The disposal of handkerchiefs.—The old method of disposing of soiled handkerchiefs by burning them after being once used was naturally a costly and wasteful one and we therefore had to consider whether it would be practicable to sterilise them and thus render them fit for further use. It was urged that if handkerchiefs were submitted to any such method of sterilisation as has been detailed above they would be so stained and otherwise injured in the process that the extra amount of use which might be expected of them would hardly warrant the expense of the apparatus required. By the use of the test apparatus, which we have already alluded to, it was proved that handkerchiefs could be so sterilised 12 times and afterwards washed by hand without suffering any material damage. The committee therefore sanctioned the construction of the following plant for sterilising and washing handkerchiefs: (1) a combined steriliser and washing machine; (2) a hydro-extractor; and (3) a calender.

The following is the procedure at present in use. The soiled handkerchiefs are conveyed from the wards in covered pails and are at once placed in the sterilising and washing

machine where they are first sterilised and afterwards washed. After washing they are taken out and placed in the hydro, which, with the calender, is in a separate room. After being dried in the hydro they are passed through the calender and are then folded and returned to the wards. It has been found that handkerchiefs costing 11*d.* per dozen may be submitted to this method of sterilisation and washing about 50 times and will last for about four months. It is probable that a somewhat better quality of handkerchief would stand longer and so might prove rather more economical. At the Frimley Sanatorium, where there is a laundry with washing machines, but not a special combined steriliser and washing machine, both sputum and handkerchiefs are sterilised in the sputum steriliser. While the attendant is engaged in sterilising the sputum flasks and pots the handkerchiefs are allowed to soak in cold water to which soap and soda have been added. As soon as the

FIG. 3.



Tank for washing sputum pots.

sputum is disposed of the handkerchiefs along with the liquor are sterilised in their turn, a temperature of 250° F. being used, and after sterilising are dried. At the end of a week about 700 handkerchiefs have been sterilised and these are then removed to the laundry and washed in the ordinary way.

The drains from all the machines above alluded to are suitably trapped and ventilated. A sputum steriliser exactly similar to the pattern already described has been erected at the King Edward VII. Sanatorium.

Our experiments upon the sterilisation of sputum seem to have established a fact which has, up to the present, as far as we are aware, not been credited—namely, that articles infected with the tubercle bacillus may be rendered sterile at a temperature of 200° F. From this it follows that any articles infected with the tubercle bacillus may with certainty be rendered sterile by boiling them in water for half an hour under atmospheric pressure.

In conclusion, we desire to express our thanks to Dr. H. Batty Shaw and Dr. E. J. Steegmann for the help they have given us in conducting the first inoculation experiments, and to Mr. Leonard S. Dudgeon for his kind assistance in the sterilisation experiments with the new sputum steriliser.

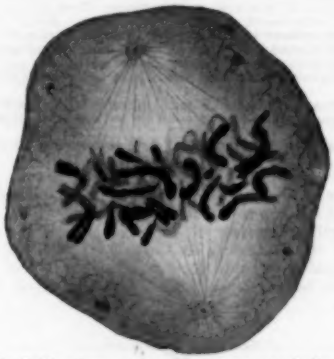
OBSERVATIONS ON THE LIFE-HISTORY OF LEUCOCYTES.[1]

BY C. E. WALKER,

ASSISTANT DIRECTOR OF THE CANCER RESEARCH LABORATORIES, UNIVERSITY OF LIVERPOOL.

WHEN the fertilised ovum of a multicellular animal or plant segments a definite number of rod-like bodies appear during the process of division. These bodies are known as chromosomes. At each subsequent division of the cells in the building up of the body of the organism the same number of chromosomes appears. This number is constant in the species. Thus in the cells forming any of the body tissues of man there are 32 chromosomes, of a mouse 24, and so on. This continues in the cells of animals and plants in the building up of all the tissues until the time approaches when definite sexual elements are to be produced. At this time certain cells go through a particular type of division in which the number of chromosomes is reduced to one-half of what is found in the somatic or body cells. Thus the

FIG. 1.



A somatic division figure. The chromosomes are in the form of their rods, U's or V's.

sexual elements possess only half the somatic number of chromosomes, and consequently when fertilisation takes place, that is, when the male and female sexual cells fuse, the somatic complement of chromosomes is regained, and a new individual is created. For example, in the case of man where the normal somatic number is 32 a spermatozoon with 16 fuses with an ovum also with 16 chromosomes, the result being that the division figure observed in the first segmentation of the fertilised ovum exhibits 32 chromosomes and this number is maintained in all the subsequent divisions until the whole body is built up and until certain cells again go through the reduction process in order to produce sexual elements. This process of reduction includes two generations of cells—that is, two divisions following each other are involved before the process is complete. The whole has been called the maiotic process and the two divisions or generations of cells involved are the first maiotic (heterotype) and the second maiotic (homotype) divisions.

In animals the cells resulting from the second maiotic division are converted directly into sexual elements without any further division. In plants, on the other hand, there may be an indefinite number of cell generations following the second maiotic division and but few of these are destined to become sexual elements. The majority form tissues with somatic characters and functions, though, having passed

[1] Abstract of a paper read before the Royal Society on Jan. 18th, 1906

through the maiotic phase, they, of course, possess only half the somatic number of chromosomes. It has therefore always been assumed that herein there existed a difference between the cycle of cell generations of multicellular animals and plants, for while in animals those cells which have reduced are all converted directly into sexual elements, in plants only a few such cells may become converted into sexual cells, the rest performing the functions of supporting and nourishing the few. Moreover, in plants apparently any

FIG. 2.

A first maiotic (heterotype) division figure. There are one-half the number of chromosomes found in the somatic division. The chromosomes are in various definite forms.

number of generations of cells may intervene between reduction and the production of sexual elements.

The observations recorded in a communication to the Royal Society on the Life History of Leucocytes by myself claim to show that in the generations of leucocytic cells we have phenomena which run more or less parallel with the post-maiotic (reduced) generations that exist in prothallial tissue in plants. It is first explained that the term leucocyte is intended to include all the wandering nucleated cells of the animal body. In the male sexual gland the sequence of events among those cells that are destined to be sexual

FIG. 3.

A second maiotic (homotype) division figure. The chromosomes are in the same form as in the somatic division but are found to be only one-half the somatic number. This type of division is the most common among the cells of the bone marrow.

elements is as follows. Up to a certain point the cells in question divide in a similar manner to the cells forming the ordinary body tissues and exhibit the full somatic number of chromosomes. This is known as the somatic type of division. The somatic are followed by amitotic divisions. That is without the appearance of any spindle figure or chromosomes—a similar division, in fact, to that of a drop of viscous fluid into two drops. After this come further somatic divisions, followed immediately by the first and second maiotic divisions. The cells resulting are converted directly into sexual elements. Among the leucocytes and their immediate ancestors a very similar series of events occurs. First we have amitosis and somatic mitoses alternating with each other just as in reproductive tissue. Then follow divisions which are similar to the first and second maiotic divisions, where the chromosomes are reduced in number to one-half of that found in the somatic cells. Here the similarity to animal reproductive cells ends and that to the reduced tissues in plants begins. Apparently there is an unlimited number of post-maiotic generations among the leucocytic cells. Furthermore, in another communication to the Royal Society[2] it is claimed that these reduced leucocyte cells may produce tissues possessing characters and functions similar to somatic tissues. If these observations are correct we have therefore a further parallel between the phenomena exhibited by animal and vegetable cells. The reduced cells of both animals and plants are out of coördination with the soma from which they have been derived. I consider that the evidence in this respect with regard to leucocytes is in favour of the correctness of my observations.

The bearing of these observations upon what happens in malignant growths may here be mentioned. It has been recorded[3] elsewhere that one of the earliest phenomena in the occurrence of malignant tumours is the invasion of the tissue cells by leucocytes with the subsequent common division of both nuclei. This produces a race of hybrid cells, half tissue cell, half leucocyte. It has also been recorded by the same authors that the cells of malignant growths reduce in a similar manner to the cells of reproductive tissues. All the forms of cell division seen in malignant tissue are also seen in normal leucocytic tissue, and both leucocytes and malignant tissue are out of coördination with the true soma. According to the present observations, then, the hybrid cells act just as would be expected and possess the characteristics, to a certain extent, of both their ancestors.

Liverpool.

ACUTE LOBAR PNEUMONIA IN A PYGMY.

BY W. HERBERT GREGORY, M.D., C.M. EDIN.

ON the evening of Oct. 14th, 1905, I was asked by Colonel J. J. Harrison to see one of the pygmies whom he brought back from the Ituri Forest. I found the patient, Matuha by name, a male, stated to be aged 23 years, lying on a mattress.[4] His temperature was 103·2° F., his pulse was 120, and his respirations were 20. By the aid of an interpreter it was found that he complained of pain in the left infra-axillary region. Three days before the patient had suddenly stopped dancing in the middle of a performance, complaining that he was tired and that his back hurt him. He was seen by a medical man and treated for a sprained muscle. No evidence of a rigor could be obtained, but the difficulty of getting any evidence of prodromata was considerable.

On Oct. 15th the temperature was 103°, the respirations were 24, and the pulse was 118, with a dry hacking cough. There was a small amount of albumin in the urine. On examination, slight dulness with some fine crepitations and rhonchi were found over the base of the left lung. There were also rhonchi over the right base, but these disappeared in a day or two. On the 16th the dulness had increased and the inflammation finally involved the whole of the lower lobe of the left lung. He was at first treated with a mixture containing one and a half drachms of antimonial wine, two drachms of spirit of nitrous ether, three ounces of solution of acetate of ammonia and water to make up six ounces, the dose being half an ounce every four hours. This was afterwards changed to a powder containing one grain of sulphate of quinine, ten grains of citric acid, and some sugar of milk, given every four hours in half an ounce of a mixture containing two drachms of bicarbonate of potash, 36 grains of carbonate of ammonia, and half an ounce of syrup of orange dissolved in six ounces of water. The diet consisted of milk, broth, and eggs. The first named

[2] On the Origin of the Sertoli or Foot-cells of the Testis, Walker and Embleton, Proceedings of the Royal Society, 1906.

[3] Farmer, Moore, and Walker: On the Behaviour of Leucocytes in Malignant Growths, Transactions of the Pathological Society of London, 1905. Ibid., on the Cytology of Malignant Growths, Proceedings of the Royal Society, 1906.

[4] See in THE LANCET, August 12th, 1905, a paper by Dr. G. E. Smith and Dr. A. Loose upon Matuha and his companions. Matuha's age was then estimated by various osteological data as about 18 years.

was taken badly at first, as the patient had never tasted it before, but the addition of alcohol in the form of whisky quite overcame this difficulty. During the fourth and fifth days the patient was very ill with great cyanosis and difficulty in breathing along with troublesome cough. The pulse became intermittent and oxygen and strychnine had to be administered and alcohol given freely. The case was a severe one but followed the usual course of an acute lobar pneumonia, the crisis occurring on the sixth day, when the temperature dropped from 103·8° to 97·2° in 18 hours. There was profuse sweating during this stage. There was a rise to 103·2° the following night, but after this the patient had an uninterrupted recovery.

An examination of the sputum (which had the typically rusty colour at first) was made by the Clinical Research Association and a certain number of pneumococci was found. An attempt was made to examine the blood for leucocytosis, but the difficulty in obtaining a specimen was so great that the idea had to be abandoned. No herpes was seen round the lips during the case. As may be imagined, the task of nursing was no light one and great credit is due to the nurse in charge of the case for the admirable way in which she managed the patient. The patient was very good throughout, although at first he was suspicious of everything done for him.

During the convalescence, which was a good one, the patient would sit for hours playing with his bow and spear, going through all the incidents of the chase. The whole case followed the course of an acute pneumonia in a white man, but the unusual type of patient has led me to report it.

Beverley.

INTERNAL SECRETION AND THE DUCTLESS GLANDS.

BY SWALE VINCENT, M.B. LOND., D.SC. EDIN.,
PROFESSOR OF PHYSIOLOGY IN THE UNIVERSITY OF MANITOBA, WINNIPEG, CANADA.

PART II.[1]

THE THYROID AND PARATHYROID GLANDS.

A. Effects of ablation and disease.—No attempt will be made to give a complete account of the history and literature of the thyroid gland. Our knowledge of the subject is not based upon so secure a foundation as a perusal of modern text-books would lead one to suppose and there can be little doubt that there has been in some directions undue haste in correlating clinical experience with the results of experimental physiology. The present state of our knowledge has been reached through different modes of investigation, some of which will now be dealt with in order. As regards the effects of removal of the organs, perhaps the most generally accepted among recent views may be briefly stated as follows. As regards vital importance, the function of the thyroid gland is subsidiary to that of the parathyroids. Removal of all the parathyroids from an animal, even if the thyroid be left intact, invariably proves fatal within a short time, and this with typical nervous symptoms described under the name of "tetany." Removal of the thyroid, on the other hand, gives rise to an entirely different train of symptoms stated to be those of "post-operative myxœdema" or of "cachexia strumipriva."[2] According to this modern conception, the divergent results obtained by the older experimenters in different classes of animals were apparent rather than real, they having failed to appreciate the anatomical differences, and having, in fact, performed a different operation in each case. This theory of the supreme importance of the parathyroids was first put forward by Gley[3] who rediscovered the (external) parathyroids[4] but was more definitely formulated and elaborated by Vassale and Generali.[5] The extreme importance to life of the parathyroids has also been affirmed by Rouxeau,[6] Moussu,[7] Welsh,[8] and Capobianco and Mazziotti.[9] The question as to the extreme importance of the parathyroids cannot yet be considered as settled. Kishi[10] found that dogs and cats often die although the parathyroids be left behind. Vincent and Jolly[11] found further that removal of all four parathyroids was not necessarily fatal. We were furthermore unable to confirm some other statements which are very commonly accepted. The general conclusions reached were as follows: "1. It cannot be truly said that either thyroids or parathyroids are essential for life, since it is frequently possible to remove either or both without causing death. 2. We find, as others have done, that fatal results when they occur are not due to injuries to surrounding structures accompanying the surgical interference but must be referred to absence of the glands in question.[12] 3. No statement, universally applicable throughout the animal kingdom, can be made as to the importance of the glands in question, whose functions appear to differ very widely in different classes of animals. Rats and guinea-pigs do not seem to suffer at all as the result of extirpation.[13] Monkeys only show transient nervous symptoms.[14] Dogs and cats frequently, but by no means invariably, suffer severely and die. In foxes symptoms come on with remarkable rapidity and death is correspondingly early. 4. The diversity of results obtained in different classes of animals is not to be attributed to anatomical but to physiological differences. 5. In no animal have we been able to induce symptoms resembling myxœdema.[15] 6. In young animals, although extirpation of the thyroid causes a temporary cessation of growth, we find that this is not necessarily accompanied by symptoms of a cretinoid nature. 7. Myxœdema and cretinism must then, we think, be due to causes more complex than simple thyroid insufficiency. 8. When the thyroid is removed the parathyroids appear capable of functionally replacing it to a certain extent and their histological structure changes accordingly."

Perhaps the point of most general interest in the above results is that myxœdema was never induced, even in monkeys. This result differs from that obtained by Horsley,[16] Murray,[17] and Edmunds,[18] who state that it is possible by operation to induce myxœdema in monkeys. Our animals were kept at ordinary indoor summer temperature and they showed no symptoms which could be described as myxœdematous. In some cases it was impossible to distinguish the operated monkeys from the controls and in a photograph which was taken of an operated animal and a normal one side by side the operated animal looked the healthier of the two. One of the animals, it is true, suffered three days after the operation from slight muscular tremors but completely recovered. Some of them suffered from catarrh and one died from some laryngeal affection and it seems probable that, as in the case of other animals, removal of the thyroid gland leaves monkeys in a condition in which they are less capable of resisting disease. We do not pretend that the monkeys were quite unaffected by the operation. They were, as a rule, perhaps somewhat

[1] Part I. was published in THE LANCET of August 11th, 1906, p. 343.

[2] Kocher, Archiv für Klinische Chirurgie, 1883, Band xxix., S. 254; Reverdin, Revue Médicale de la Suisse Romande, 2me année, 1882, p. 530; 1883, Nos. IV.–VI., p. 169; 1887, pp. 275, 318.

[3] Comptes Rendus de la Société de Biologie, 1891, p. 843.

[4] These bodies were first described by Sandström, Upsala, Läkareförenings Forhandlingar, 1880, Band xv. Reference in Schmidt's Jahrbuch, 1880; Hofmann-Schwalbe's Jahresbericht, 1881; Virchow and Hirsch's Jahresbericht, 1880.

[5] Rivista di Patologia Nervosa e Mentale, 1896, vol. i., fasc. 3 and 7; Archives Italiennes de Biologie, 1896, tomes xxv. and xxvi., p. 459.

[6] Comptes Rendus des Séances de la Société de Biologie, 1897, p. 17.

[7] Ibid., p. 44.

[8] Journal of Anatomy and Physiology, 1898, p. 401; Journal of Pathology and Bacteriology, 1899.

[9] Giornale Internationale delle Scienze Mediche, 1899, anno xxi.

[10] Virchow's Archiv, 1904, Band clxxvi., S. 280.

[11] Journal of Physiology, vol. xxxii., 1904.

[12] This was the result of some few experiments in which injury to surrounding structures was done without removal of either thyroids or parathyroids. No typical symptoms were observed in these cases but there is still a possibility that if a larger number of experiments were performed and the necessary conditions were understood some of the nervous symptoms may after all not be due to absence of the glands. This possibility is suggested by the fact that tetany may come on at variable periods from five hours to a week after operation.

[13] Such extirpation including parathyroids as well as thyroids.

[14] In a new series of observations by Mr. Jolly and myself, the results of which have not yet been published, one monkey died within 24 hours after the operation with what appeared to be typical tetany. It was found, however, post mortem that the recurrent nerve and other structures had been included in one of the ligatures.

[15] I.e., there has been no swelling of the subcutaneous tissues.

[16] Proceedings of the Royal Society, 1884, No. 235, and 1886; Brit. Med. Jour., Jan. 17th and 31st, 1885; Internationales Centralblatt für Laryngologie, July, 1885; Comptes Rendus des Séances de la Société de Biologie, December, 1885; Report of the Myxœdema Committee of the Clinical Society of London, 1889; THE LANCET, December, 1886; Brit. Med. Jour., Feb. 8th and July 28th, 1890; Internationale Beiträge zur Wissenschaftlichen Medicin, Virchow's Festschrift, i., 1891.

[17] Diseases of the Thyroid Gland. London: Lewis, 1900.

[18] Journal of Pathology, vols. iii., v., vi., and vii., 1896-1900; the Pathology and Diseases of the Thyroid Gland, Edinburgh and London, 1901.

quister than normal; but we do insist that the striking feature of myxœdema in man—viz., swelling of the subcutaneous tissues—was totally absent.

It is important to note that removal of the parathyroids, included of course in the complete operation, has not proved fatal and if it should ultimately be determined that simple parathyroidectomy without injury to the thyroid is a fatal operation it will show that removal of parathyroids alone is much more serious than extirpation of thyroids and parathyroids together. This has, in fact, been alleged by some observers.

Of course, it is open to insist that somewhere in the body of the above-mentioned animals there were accessory thyroids or parathyroids which sufficed to maintain life after the removal of the main organs. We can only reply that a most careful search for such bodies has always been made and that in the absence of positive evidence their existence is a pure conjecture. Moreover, if accessory glands be so usually present, then the question as to the importance to life of the glands ceases to have the value hitherto attached to it.

Another point of importance in the above research is the observation that when parathyroids alone are left behind they appear to take on both the structure and the function of the thyroids. This will be referred to again in connexion with the question as to the relation between thyroids and parathyroids.

B. Artificial renewal of thyroid and parathyroid secretion.—1. By grafting. There can be little doubt that the leaving behind of a thyroid lobe, or even, according to the majority of authors, a very small shred of thyroid tissue, will suffice to keep the animal in good health. This observation naturally led to experiments in the direction of grafting. Schiff,[19] who was the first to perform in a systematic manner extirpation of the thyroid, was also the first to attempt grafting. But his grafts *qud* grafts were not successful.[20] He, however, states that he succeeded in prolonging the life of his dogs after thyroidectomy, but this success may have been due, according to the modern conception, to the temporary supply of thyroid secretion furnished by the gland substance and analogous to a subcutaneous or intravenous injection of thyroid extract or to a process of feeding with thyroid substance. Schiff operated upon dogs with the thyroids of other dogs, two to five weeks before performing thyroidectomy. The grafts did not "take" and were gradually absorbed. Since the time of Schiff very numerous grafting experiments have been performed.[21] These were for a long time unsuccessful.[22] It was not until Eiselsberg's second publication[23] that any really satisfactory grafting experiments were recorded. This author found that in four cats the operation was completely successful, both from an anatomical and a physiological standpoint. A little later appeared a series of papers by Cristiani,[24] who was equally successful in 16 out of 19 rats in his earlier series of experiments and who afterwards performed a very large number upon many different species of animals. Pantaleone[25] was not so successful, while Munk[26] was only partially successful. Enderlen[27] and Sultan[28] obtained fairly good positive results. Cristiani,[29] by taking special precautions, succeeded in thyroid grafting in all species of animals in which he tried it. In order that the graft should be successful it is necessary that the organ transplanted should not be too voluminous. For small animals (rats, young weasels, &c.) one can graft entire lobes of the gland, but for larger animals it is necessary to divide the organ into flat or elongated slices. The thyroid graft carried out under these conditions and with the surgical precautions detailed by Cristiani not only does not become absorbed but actually increases according to the needs of the organism into which it has been grafted. Grafting may succeed not only when performed into a different part of the body of the same animal but also between different animals of the same species and sometimes also between different species and even families.[30]

The success of these grafting experiments in preventing the onset of symptoms after thyroidectomy is a very strong argument in favour of the view that the ill-effects following the extirpation are in reality due to the loss of the internal secretion of the organ and not to injury to nerves or other similar cause. In the experiments referred to above the graft was a "thyroparathyroid" graft. Some work has, however, been done in the direction of pure parathyroid grafts and apparently with some measure of success.[31]

Horsley[32] suggested that grafting should be tried in man to arrest the progress of myxœdema. This was carried out with partial success by Bircher[33] and by Bettencourt and Serrano.[34] But as in the case of Schiff's grafting experiments the grafted gland was in most cases absorbed and the beneficial effects were not permanent. Only in one case has the improvement lasted for more than a few months. This was in a case of myxœdema recorded by MacPherson,[35] in which all the symptoms disappeared after the operation and had not returned three years later.

2. *By injection of juice or extracts of the glands.*—Pisenti and Viola[36] appear to have been the first to employ experimental opotherapy. Vassale[37] and Gley[38] found that a temporary benefit accrued after thyroidectomy if the animal were subjected to an intraperitoneal injection of thyroparathyroid juice. But these results have not been obtained by all observers[39] and according to some writers the extract to be of any service must contain *parathyroid* juice. It is, indeed, stated that pure thyroid extract is actually harmful after cases of extirpation of both organs.[40] It has further been held that injection of parathyroid extract is of great benefit in preventing or postponing the symptoms due to absence of parathyroids.[41] Murray[42] also employed a glycerine extract of sheep's thyroid with which he treated monkeys after thyroidectomy. This author found that in some cases the symptoms disappeared, but in others there was only an improvement and death afterwards ensued with acute nervous symptoms.[43] He suggests that in the latter case the parathyroids were extirpated along with the thyroid, while in the former they were left behind,[44] and he says that it is not surprising that the parathyroid symptoms are not relieved by thyroid treatment.[45]

[19] Revue Médicale de la Suisse Romande, 1884, p. 438.

[20] See Cristiani, Journal de Physiologie et de Pathologie Générales, 1901, p. 200.

[21] Kocher (Correspondenzblatt für Schweizer Aerzte, 1896) relates that he had in 1883 attempted grafting in the human subject after ablation and with some temporary benefit.

[22] Carle, Centralblatt für Physiologie, 1888, vol. ii., p. 213, No. 9; Drobnik, Archiv für Experimentelle Pathologie und Pharmacologie, 1889 vol. xxv., S. 136; Zuccaro, Prog. Med. di Napoli, 1890; Eiselsberg, Ueber Tetanie im Anschlusse an Kropfoperationen, 1890; Ferretti, Riforma Medica, 1891, vol. iv., p. 479; Sgobbo e Samari, Rivista di Clinica e Terapia, 1892; Canizzaro, Deutsche Medicinische Wochenschrift, 1892, S. 124; Ughetti, Riforma Medica, 1892, vol. iv., p. 675; Montandon, Congrès International de Médecine, Rome, 1894, 2, Path., p. 283; Bouchard, Association Française pour l'Avancement de Sciences, Paris, 1892, 1ère partie, p. 292.

[23] Wiener Klinische Wochenschrift, 1892, No. 5, p. 81.

[24] Comptes Rendus des Séances de la Société de Biologie, 1894, p. 716, and 1900, p. 967; Archives de Physiologie, 1895, tome xxvii., p. 65; Journal de Physiologie et de Pathologie Générales, 1901, p. 204.

[25] Centralblatt für Chirurgie, 1897, p. 601 (abstract); Gazzetta degli Ospedali e delle Cliniche, 1897.

[26] Quoted from Cristiani, Journal de Physiologie et de Pathologie Générales, 1901, vol. iii., p. 204.

[27] Mittheilungen aus den Grenzen der Medicin und Chirurgie, 1896, Band iii.

[28] Centralblatt für Allgemeine Pathologie, 1898, vol. ix., p. 388.

[29] Loc. cit.

[30] Cristiani, V. Congrès International de Physiologie, 1901, Turin Sept. 17th-21st.

[31] Cristiani, Comptes Rendus des Séances de la Société de Biologie, 1900, p. 967; Progrès Médical, 1901, tome xiv., p. 235; Cristiani et Ferrari, Comptes Rendus des Séances de la Société de Biologie, 1897, p. 885; Ferrari, Thèse, 1897; Lusena, Riforma Medica, 1898, and XIV.; also Fisio-patologia dell' Apparecchio Tiro-paratiroideo, 1899, pp. 97, 98, &c.

[32] Brit. Med. Jour., 1890, vol. i., p. 287.

[33] Der Endemische Kropf, &c., 1883; Revue Médicale de la Suisse Romande, 1883, p. 586; also Volkmann's Sammlung Klinischer Vortäge (Chir.), 1890. No. 357, p. 3393.

[34] Association Française, pour l'Avancement des Sciences, 1890; abstract in Gazette des Hôpitaux, 1890, p. 869.

[35] Quoted from Murray: Diseases of the Thyroid Gland, 1900, part 1, p. 22.

[36] Atti e Rendiconti della Acad. Medico-Chir. di Perugia, 1890, 2 ma.

[37] Rivista Sperimentale di Frenatria, &c., 1890, vol. xvi., p. 439, fasc. 4; Archives Italiennes de Biologie, 1892, tome xvii., p. 173.

[38] Comptes Rendus des Séances de la Société de Biologie, 1891, p. 250; Archives de Physiologie, 1892, vol. xxiv., p. 311.

[39] See Schwarz, Lo Sperimentale, 1892, mem or'g., p. 19.

[40] Pugliese, Gazzetta degli Ospedali e delle Cliniche, &c., Nov. 20th, 1898, No. 139, p. 1465. This observation may be compared with that of Lusena (loc. cit.), and of Vassale and Generali (Archives Italiennes de Biologie, 1900, tome xxxiii., p. 154), that the ill-effects of parathyroidectomy are relieved by thyroidectomy.

[41] Moussu, Comptes Rendus des Séances de la Société de Biologie 1898, p. 867; Lusena, loc. cit.

[42] Op. cit.

[43] But monkeys frequently recover from the nervous symptoms even if no thyroid treatment be adopted.

[44] In most common species of monkeys, at any rate, the parathyroids are practically certain to be removed along with the thyroids.

[45] But it must be borne in mind that the thyroid extract would contain also parathyroid substance. He does not state, at any rate, that the parathyroids were cut away before the extract was made. The supporters of the view that the parathyroids possess a separate

3. *By administration of thyroid and parathyroid extract by the mouth.*—This method was first employed by Howitz,[46] E. L. Fox,[47] and Mackenzie,[48] and was soon universally adopted for the treatment of myxœdema. It has been found to be just as efficacious as injection intraperitoneally or subcutaneously.[49]

C. The question as to an intimate functional relationship between thyroids and parathyroids.—Some of the earlier observers looked upon the parathyroids as simply undeveloped portions of the thyroid gland. The actual transformation of parathyroid into thyroid tissue has been denied by the majority of investigators.[50] Gley, who was the chief supporter of the theory that the parathyroids were embryonic thyroids, subsequently abandoned this view and substituted for it a theory of a functional relationship between the two bodies.[51] This theory is based upon three kinds of proofs. 1. Chemical. Gley finds in the parathyroids of the rabbit about 25 times more iodine than in the thyroid, in the dog six times more. The presence of iodine in the parathyroid has been confirmed by Mendel[52] and by Pagel.[53] These observations tempted Gley[54] to the hypothesis that the parathyroids prepare the secretion, which is then stored in the thyroids and utilised according to the needs of the economy. If the iodine be not rendered harmless by elaboration in the parathyroid (as when these are extirpated) then we get acute symptoms. If the iodine be subjected to preparation in the parathyroid but is not distributed to the body by way of the thyroid (as when this is extirpated) then we get nutritive troubles from the absence of assimilable iodine in the body. 2. Physiological. Very occasionally complete parathyroidectomy, leaving the thyroid *in situ*, is stated to give rise not to acute symptoms but to slowly progressive changes in bodily nutrition, resembling those produced by simple thyroidectomy (leaving one or more parathyroids behind). It is alleged by Lusena[55] and also by Vassale and Generali[56] that simple parathyroidectomy kills more rapidly than thyro-parathyroidectomy.[57] This is explained by Vassale and Generali by supposing that when the parathyroids are removed the animal is in a toxic condition, which is the more marked when the nutritive changes of the body generally are more pronounced. The tetany then will be more or less serious according as the thyroid is more or less active and therefore logically will be much less marked after ablation of the gland. 3. Histological. According to Edmunds and Vassale and Generali[58] there is a disappearance of the colloid substance in the thyroid after removal of the parathyroids. These arguments are put forward by Gley to support his theory as to a functional relationship between thyroid and parathyroid. This theory is also held by Jeandelize.[59] The presence of iodine may not after all be a matter of supreme significance for the function of either thyroid or parathyroid. Hutchison[60] says: "One would conclude from the whole evidence that the iodine in the thyroid gland, if it plays an essential part in the activity of the latter at all, does so simply in virtue of the special form of combination in which it is present." He points out that Mirva and Stoltzer[61] found that there was no iodine in the thyroids of young infants or in those of dogs fed exclusively on meat, and concluded that the presence of iodine is not essential for the activity of the gland. But there can be no doubt that there are important morphological and physiological relationships between thyroid and parathyroid. Kishi[62] definitely states, as did the older observers, that the parathyroids are not separate and independent organs but are embryonic thyroids. Vincent and Jolly[63] found that parathyroids left behind after thyroidectomy can under certain conditions develop in the direction of thyroid tissue and a functional replacement also takes place.[64] The two structures are derived from very similar sources and even in the fully developed state there is no fundamental difference between their constituent cells. The intervesicular tissue of the thyroid is practically identical with parathyroid, and parathyroid has only to contain colloid vesicles in order to constitute itself thyroid. Dr. Chalmers Watson has recently sent me a slide which shows human "parathyroids" containing some colloid vesicles and this has also, I believe, been previously observed. It is difficult to imagine any other explanation of this occurrence than that thyroid and parathyroid are morphologically and functionally very intimately related to each other.

D. Chemistry of the thyroid.—The question naturally arises, What is the chemical nature of the active principle of the thyroid gland? What is the substance, or what are the substances, manufactured by the thyroid and supplied to the body, the absence of which causes such serious metabolic disturbances in some animals? We may say at once that there is at present no satisfactory answer to the question. Fränkel[65] separated from the gland a crystalline substance having the formula $C_9H_{11}N_2O_3$ which he called *thyreo-antitoxin*. This he thought was the active principle of the organ. In 1895 Baumann[66] discovered the presence of iodine in the thyroid glands and prepared a substance from them containing as much as 9·3 per cent. of iodine. This is an organic compound of iodine. It is prepared by treating thyroids with 10 per cent. sulphuric acid with the aid of heat. On cooling a precipitate comes down which is dissolved in alcohol. From the alcoholic residue the fat is removed with petroleum ether and the substance remaining is dissolved in 10 per cent. caustic soda. The brown solution is precipitated again with sulphuric acid. The product is a brown amorphous substance insoluble in water and soluble with difficulty in alcohol. It is readily soluble in dilute alkalies and is precipitated by acids. It contains no proteid but some phosphorus (0·4–0·5 per cent). [The amount of iodine per gramme of the organ in human adults varies from 0·3 to 0·99.] This substance prepared by Baumann has been put upon the market as thyroiodin by Bayer and Co. of Elberfeld. Baumann and Roos claimed that this was, in fact, the active principle of the thyroid gland; and Hildebrandt[67] finds that thyroiodin alone is able to counteract the effects of thyroidectomy and to keep the animal alive. It represents the physiologically active principle of the thyroid gland. This author states that the excretion of albumin and sugar in the urine which accompanies the severe symptoms induced by thyroidectomy ceases under the administration of thyroiodin. Other salts of iodine are unable to prevent the onset of symptoms. As to the fate of the iodine of the thyroiodin he finds that it is held back in the body with extreme ease, while simple iodine preparations appear almost at once in the urine. He lays special stress on the fact that thyroiodin does not appear in the urine of a dog from whom the thyroid has been removed; hence other organs of the body must have the power of holding back the thyroiodin. On the other hand, the building up of the complicated combination present in thyroiodin from the simple iodine is to be looked upon as a specific function of the thyroid gland.[68]

functional importance would urge that more parathyroid material is required when administered in this manner than is naturally included in the extracts.

[46] Comptes Rendus du XIV. Congrès des Naturalistes Scandinaves, Copenhagen, 1892, p. 517.

[47] Quoted from Murray, op. cit.

[48] Brit. Med. Jour., Oct. 29th, 1892, p. 940.

[49] Moussu (Comptes Rendus des Séances de la Société de Biologie, 1899, p. 241) found that feeding young animals with thyroid gland causes first emaciation, but later the animal becomes longer, taller, and generally more elegant than the control. The effects according to Moussu are in fact precisely the antithesis of thyroid insufficiency, cretinism.

[50] See Gley, Archives de Physiologie, 1892, vol. xxiv., p. 146; Comptes Rendus des Séances de la Société de Biologie, 1899, p. 845; Gley et Phisalix, XI. Congrès International de Médecine, 1894, in Archives Italiennes de Biologie, 1895, tome xxii., p. 41; Moussu, Comptes Rendus des Séances de la Société de Biologie, 1893, pp. 280 and 283; Hofmeister, Beiträge zur Klinischen Chirurgie (Bruns.), 1894, Band ii., p. 441; Gley et Nicolas, Comptes Rendus des Séances de la Société de Biologie, 1895, p. 216; Kohn, Archiv für Mikroskopische Anatomie, 1895–96, Band xliv. and xlviii; Nicolas, Biolog. Anatom., Nancy, 1896; Blumreich and Jacoby, Berliner Klinische Wochenschrift, 1896, p. 325; Verdun, Thèse, Toulouse, 1896–97, p. 31; Ver Eecke, Archives Internationales de Pharmacologie, 1897.

[51] V. Congrès International de Physiologie, Turin, 1901.

[52] American Journal of Physiology, 1900, vol. iii., p. 263.

[53] Cited by Jeandelize, Insuffisance Thyroïdienne, &c., Paris, 1903.

[54] Congrès International de Moscou, Août, 1897, Path. vol. ii., p. 192.

[55] Fisio-patologia dell' Apparecchio Tiro-paratiroideo, 1899, p. 108.

[56] Archives Italiennes de Biologie, 1900, tome xxxiii., p. 154.

[57] In dogs this is certainly sometimes the case, but the results are very inconstant.

[58] Archives Italiennes de Biologie, 1896, tome xxv., p. 484.

[59] Op. cit.

[60] Journal of Physiologie, 1898–99, vol. xxiii., p. 182.

[61] Jahrbuch für Kinderheilkunde, 1897, Band xlv., p. 83.

[62] Virchow's Archiv, 1894, Band clxxvi., S. 290.

[63] Loc. cit.

[64] It would be rash in the present state of our knowledge to assert positively that the parathyroids are simply embryonic thyroids, for the morphological and developmental evidence seems rather against this view. See Kohn, Archiv für Mikroskopische Anatomie, 1895–96, Band xliv. and xlviii., where full references will be found.

[65] Wiener Medicinische Blätter, 1895, No. 43; 1896, Nos. 13, 14, und 15.

[66] Zeitschrift für Physiologische Chemie, 1895, Band xxi., p. 319; 1895–97, Band xxii., p. 1; Münchener Medicinische Wochenschrift, 1896, Nos. 14 und 20, pp. 329, 476, vol. xliii.; Baumann und Roos, Zeitschrift für Physiologische Chemie, 1896, Band xxi., p. 481; E. Roos, Ibid., 1897, Band xxii., p. 18; also Roos, Ueber Schilddrüsentherapie und Iodothyrin, 1897.

[67] Berliner Klinische Wochenschrift, 1896, Band 33, S. 826.

[68] So also Blumreich and Jacoby (Archiv für Physiologie, 1896, 64)

Baumann showed a rise of the iodine present in the thyroids of animals treated with potassium iodide or iodoform. Vassale[69] held that intravenous injection of thyroid extract prevented the ill-effects of thyroidectomy but Thuneberg[70] held the opposite view. Baumann and Roos,[71] Baumann and Goldmann,[72] and Hofmeister[73] agree that thyroiodin is able to supply the functions of the gland after removal, but Gottlieb[74] and Notkin[75] could not confirm this result. Wormser[76] believed that none of the single substances obtained from the thyroid was able to replace its functions and thought it necessary to give them all at the same time if they were to serve as substitute for the normal internal secretion of the gland. Stabel[77] at about the same time came to the conclusion that neither thyroiodin nor thyroid gland substance was able to keep dogs alive after thyroidectomy. So also Pugliese.[78] This observer removed the thyroids from 12 dogs and fed the animals on thyroid "tabloids." All the animals died at 2, 3, 6, 7, 12, 16, 23, 30, and 68 days after the operation, the earlier ones from tetanic symptoms, the later ones from cachexia. Pugliese's observations then stand in opposition to those of Gottlieb and Wormser, but in agreement with those of Stabel, and show that the giving of thyroid preparations is in no way able to keep an animal alive after thyroidectomy.[79]

It is thus evident that Baumann's thesis as to the identity of his thyroiodin with the actual functionally active principle of the gland has not been sustained by all later observations. At any rate, the statements on this point are very conflicting. Any accounts of beneficial results arising from any kind of treatment after thyroidectomy are to be received with extreme caution, since the results of the operation are so inconstant and symptoms frequently diminish or even disappear in animals which are left entirely without any treatment.[80] But there are other objections to Baumann's theory. Iodine is absent from the thyroids of some animals. Baumann himself states[81] that while the thyroid of a dog fed upon Spratt's dog biscuits contains iodine, this element is absent after a meat diet. In the ox, horse, and pig iodine may be absent or may be present in the merest traces[82]; further, Baumann admits that iodine cannot always be found in the human thyroid. One of Baumann's chief arguments in favour of his view lay in the observation that administration of thyroiodin in cases of goitre causes disappearance of the tumour. But this is a known remedial action of iodine[83] *quâ* iodine and proves nothing as to the therapeutic efficiency of the thyroiodin. Good results have been alleged to follow the administration of various inorganic and organic preparations of iodine[84] and certain sea animals and plants which contain iodine have been used as medicaments, and especially in cases of goitre, for hundreds of years before the discovery of iodine.[85] It is possible, as Bunge[86] suggests, that the organic form of iodine may be more readily absorbed and reach the part where its influence is effective. According to Oswald[87] the iodine of the thyroid gland is bound up with a globulin-like body and the compound is called by him *thyreoglobulin*. This, he says, has all the physiological properties of thyroiodin.[88] From it one can isolate the thyroiodin. The thyreoglobulin forms, along with a nucleo-proteid, the colloid substance of the thyroid vesicles. No chemically pure substance has, however, yet been isolated from the thyroid gland and the presence of the iodine is of problematic significance.[89]

E. Influence of the thyroid upon metabolism.—In the treatment of myxœdema and different forms of goitre, a rapid loss of weight is noted on feeding with thyroid gland substance.[90] This is partly due to loss of subcutaneous tissue, partly to loss of water. Thyroid preparations are used to reduce obesity with good results.[91] In order to explain these effects several series of experiments have been performed, with the object of directly studying the influence of the administration of thyroid glands upon metabolism.

The experiments of Ord and White,[92] Mendel,[93] Napier,[94] and Vermehren[95] pointed to a distinct increase of nitrogen in the urine with a concomitant decrease of weight, pointing to increase of proteid metabolism. But in all these experiments, which were of short duration, the total intake and total output were not accurately determined. Similar results were obtained by Dennig,[96] Bleibtreu and Wendelstadt,[97] Bürger,[98] Roos,[99] Zum Busch,[100] Dinkler,[101] and Georgiewsky.[102] The duration of the experiments here was at most 14 days. Other workers have found little or no increase in nitrogen excretion—e.g., Ewald,[103] in a case of myxœdema. Scholz[104] and Richter[105] found a very small increase in the amount of nitrogen excreted. The nitrogen balance remained positive.

The discovery of iodine in the thyroid gland by Baumann[106] and the isolation of thyroiodin as the probable active principle led observers to test the action of this last upon metabolism. Treupel,[107] Grawitz,[108] David,[109] and Dinkler,[110] by observations on the human subject, and Roos[111] who used a small dog, came to the conclusion that thyroiodin influenced metabolism in the same way as the thyroid gland substance itself in that the body weight diminished and the nitrogen secretion increased.

Some experiments of short duration are recorded directed to the estimation of the oxygen taken in and the carbon dioxide given out during thyroid administration. These respiration experiments were carried out after the Zuntz-Geppert method. Magnus-Levy[112] found in a normal

"Die Wirkung der Schilddrüse besteht wahrscheinlich in der Ueberführung einer giftigen in eine ungiftige Substanz; durchaus möglich ist, dass es sich dabei um eine Umwandlung von Iod in Thyroiodin handelt, das dann weitere Wirkungen im Organismus entfalten kann."

[69] Rivista Sperimentale di Frenatria, 1890, vol. xvi., p. 439.

[70] Archiv für Anatomie und Physiologie, 1892, S. 112 (communicated by Munk).

[71] Münchener Medicinische Wochenschrift, 1896, p. 476.

[72] Ibid., 1896, 43, S. 1153.

[73] Deutsche Medicinische Wochenschrift, 1896, No. 22, p. 354.

[74] Ibid., 1896, pp. 235 and 271.

[75] Wiener Klinische Wochenschrift, 1896, No. 43, S. 980.

[76] Pflüger's Archiv, 1897, 67, S 505.

[77] Berliner Klinische Wochenschrift, 1897, No. 33, S. 121.

[78] Pflüger's Archiv, 1896, Band lxxii., p. 305.

[79] Coronedi, G., Atti dell' Accademia medico fisiologica fiorentina, 1903, has recently found that administration of haloid fats has a marked effect in preventing the onset of symptoms after thyroidectomy. This, if confirmed, would point to the therapeutic value of organically bound iodine.

[80] See Vincent and Jolly, loc cit.

[81] Zeitschrift für Physiologische Chemie, 1896, Band xxii., p. 14.

[82] Töpfer: Wiener Klinische Wochenschrift, 1896, No. 8, p. 141.

[83] Coindet: Bibliothèque Universelle de Genève, 1820, vol. xiv., p. 190.

[84] O. Schödorff: Beiträge zur Therapeutischen Verwerthbarkeit des Iodes, 1889. Dissertation, Würzburg.

[85] Bunge, Physiologische und Pathologische Chemie. English Translation, 1902, p. 441; Harnack, Münchener Medicinische Wochenschrift, 1896, No. 9, p. 196.

[86] Loc. cit.

[87] Zeitschrift für Physiologische Chemie, 1889, Band xxvii., S. 14.

[88] Pflüger's Archiv, 1901, Band 83, p. 199.

[89] I can find nowhere any very definite statement as to the percentage of iodine present in the various organs and tissues of the body. Some isolated observations show that small quantities of iodine can be found in the thymus and pituitary. Drechsel found iodine in organic combination in the skeleton of *Gorgonia cavolinii*, and on decomposing obtained a crystalline amido-acid (iodo-gorgonic acid), $C_4H_5NIO_2$. The same observer also records the discovery of iodine in the hair of a patient who had been treated with iodide of potassium. Drechsel confirms the existence of Baumann's thyroiodin and of Fränkel's thyreo-antitoxin, and adds the discovery of still another crystalline basic substance. Hutchison (loc. cit., supra) finds that the physiological activity is always associated with the iodine-containing substance. It seems that the thyroid has the power of storing up any iodine which may be introduced into the body. See Drechsel, Centralblatt für Physiologie, 1896, Band ix., S. 705; Fränkel, Wiener Medicinische Blätter, 1895, Band 48; 1896, Nos. 13–15; Notkin, Wiener Medicinische Wochenschrift, 1896, No. 45, S. 824; Virchow's Archiv, cxliv., supplement, 1896, S. 224; Hutchison, Centralblatt für die Medicinischen Wissenschaften, 1896, S. 209; Brit. Med. Jour., 1896, vol. i., p. 722; 1897, vol. i., p. 194; Journal of Physiology, 1896, vol. xx., p. 474.

[90] See literature quoted by Leichtenstern, Deutsche Medicinische Wochenschrift, 1893, Nos. 49–51, pp. 1297 and 1354.

[91] Leichtenstern und Wendelstadt: Deutsche Medicinische Wochenschrift, 1894, No. 50, pp. 932 and 934.

[92] Brit. Med. Jour., 1893, vol. ii., p. 217.

[93] Deutsche Medicinische Wochenschrift, 1893, p. 25, No. 2.

[94] THE LANCET, Sept. 30th, 1893, p. 805.

[95] Deutsche Medicinische Wochenschrift, 1893, Nos. 11 and 43, SS. 254 and 1037.

[96] Münchener Klinische Wochenschrift. 1895, SS. 389 und 464.

[97] Deutsche Medicinische Wochenschrift, 1895. No. 22, p. 346.

[98] Inaugural Dissertation, Halle, 1895.

[99] Zeitschrift für Physiologische Chemie, Band xxi., S. 19.

[100] Dermatologische Zeitschrift, 1895, Band ii., Heft 5. S. 433

[101] Münchener Medicinische Wochenschrift, 1896, No. 22, S. 513.

[102] Centralblatt für die Medicinischen Wissenschaften, 1895, No. 27, p. 465.

[103] Berliner Klinische Wochenschrift, 1895, No. 3, S. 55.

[104] Centralblatt für Innere Medicin, 1895, Nos. 43 und 44, S. 1041 und 1069.

[105] Ibid., 1896, Band xxii., p. 1.

[106] Loc. cit.

[107] Münchener Medicinische Wochenschrift, 1896, No. 6, S. 117, and No. 38, S. 884.

[108] Ibid., 1896, No. 14, S. 312.

[109] Zeitschrift für Heilkunde, Band 17, S. 429.

[110] Münchener Medicinische Wochenschrift, 1896, No. 32, S. 513.

[111] Zeitschrift für Physiologische Chemie, 1895, Band xxi., S. 19; Münchener Medicinische Wochenschrift, 1896, No. 47, S. 1157.

[112] Berliner Klinische Wochenschrift, 1895, No. 30, S. 650.

man during the exhibition of thyroid glands a not very distinct increase of the oxygen intake and the carbonic acid output. Later experiments by the same author[113] on a myxœdematous patient gave on the other hand an increase of 80 per cent. in the oxygen intake under the influence of thyroid and 43 per cent. under the influence of iodothyrin.

The experiments of Stüve[114] on a healthy man showed an increase of oxygen intake of 20–23 per cent. and a somewhat smaller increase of carbon dioxide excretion. Thide and Nehring[115] also found an increase of oxygen intake amounting to 20 per cent.; the carbon dioxide output was smaller and irregular. The distinct increase of oxidation processes shown in these experiments proves that the greater part of the loss of weight under the influence of thyroid feeding is caused by loss of fat. The question as to whether the proteid is also used up to any extent remains unanswered, for the experiments are of too short a duration to exclude the possibility of the increased nitrogen excretion being due to an increased excretion of urea and other nitrogen-containing compounds already stored up in the organism.

Schöndorff[116] has performed a very careful series of experiments of long duration upon dogs and has reached the conclusion that metabolic processes are distinctly increased by the administration of thyroid substance. There is at first no influence on proteid metabolism, but an increase in nitrogenous excretion from increased elimination of nitrogen-holding extractives already present in the body. The body fat is first used up. After a certain period, however, the proteid is also attacked. On stopping the thyroid administration the metabolism returns to normal, while renewed administration leads to increased nitrogenous excretion.[117]

F. Physiological effects of intravenous and subcutaneous injections of thyroid extracts in the normal animal.—The extraordinary physiological effects produced by the intravenous injection of extracts of the suprarenal medulla[118] have led to numerous experiments with extracts of very many organs and tissues. No effects at all comparable with those of suprarenal medulla are produced by any of them.[119] All tissues yield to normal saline solution or water some substance or substances which lower blood pressure to a greater or less extent. Nervous tissues are the most powerful in this direction, but muscular and glandular tissues have a similar effect.[120] There is at presence no evidence that in any of these cases the action is a specific one. Extracts of thyroid gland, then, in common with other tissue extracts, cause dilatation of peripheral arterioles and lowering of the general blood pressure.[121] What the pharmacologically active substances may be is not yet determined. Hutchison[122] found that injection of a solution of the colloid matter has no effect on blood pressure. Injection of a solution of the extractives produces a decided fall, the degree of the latter being proportional to the strength of the solution of extractives employed. A solution of the mineral ingredients contained in the solution of extractives produces a slight fall, but not nearly sufficient to account for the lowering of blood pressure which follows injection of the extractives.[123] This observer did not succeed in producing intravascular clotting in rabbits by the injection of the colloid matter.

Subcutaneously injected extracts of the thyroid gland produce no very striking effects; there is a slight stimulating action such as one gets with other organs and tissues. Oliver and Schäfer[124] found no change in the heart-beat as the result of injection of thyroid extract.[125] Baumann's thyroiodin appears to have no effect on the heart.[126] It has been alleged that the resistance to fatigue of the voluntary muscles is increased by the administration of thyroiodin.[127] Cleghorn,[128] who performed his experiments upon the isolated mammalian heart, found that thyroid extracts augment the force and slightly quicken the rate of contraction, but with larger doses the effect was reversed. This observer also obtained similar results with thyroiodin but not with iodine itself.

Extracts of parathyroid injected intravenously produce a fairly marked lowering of the blood pressure. Subcutaneously, so far as I am aware, they have not been tested.

G. Theories as to the function of the thyroids and parathyroids.—The facts detailed above point to the theory that the thyroid gland furnishes in the form of an internal secretion some substance or substances which are in some animals essential for the maintenance of health. The results of extirpation in young animals, the effects of thyroid deficiency in human beings, combined with the beneficial effects of grafting and opotherapy, are strong arguments in favour of this view. A different theory is held by many writers, who are inclined, as also in the case of the suprarenal capsules, to believe that the gland has the function of destroying toxic products of metabolism.[129] It is possible, of course, that both theories may be correct, though the fact that such a small quantity of tissue is sufficient to fulfil the functions of the organ seems to point to the internal secretion as the more probable. Bunge[130] believes that the active substance is probably of the nature of a ferment.

The old theory of Simon[131] that the thyroid regulates the blood-supply to the brain, has found some modern supporters. The remarkably large supply of blood to the organ and the intimate anatomical relations subsisting between its arteries and those which supply the blood to the brain, have induced Stahel[132] and Waldeyer[133] to agree with the view of Simon. But the idea has been most fully developed by Cyon from the experimental side. He concludes that the function of the thyroid consists in the formation of a substance—thyroiodin—whose duty is to maintain in good order the regulating nervous mechanism of the heart.[134]

With regard to the parathyroids, it will be seen from what has been said above that they cannot be looked upon as organs independent of the thyroid. We must, in fact, look upon thyroids and parathyroids as constituting one apparatus.

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[113] Deutsche Medicinische Wochenschrift, 1896, No. 31, S. 491.

[114] Festschrift des Städtischen Krankenhauses in Frankfurt am Main, September, 1896.

[115] Zeitschrift für Klinische Medicin, 1896, Band xxx., S. 41.

[116] Pflüger's Archiv, 1897, Band lxvii., S. 395 et seq.

[117] The effects of thyroid and parathyroid feeding upon metabolism have been recently studied by Easterbrook (THE LANCET, August 27th, 1898, p. 546; Brit. Med. Jour., Sept. 22nd, 1900; Scottish Medical and Surgical Journal, November and December, 1900), in the healthy subject and in patients suffering from mental diseases. This observer finds that there are considerable loss of weight, some pyrexia, and increased perspiration. The blood shows diminution in the hæmoglobin and to a greater extent in the red cells and slight leucocytosis. There were headaches, pains, tinglings, and prickings, as well as tremors of the face, fingers, and limbs. There were also weakness and a feeling of exhaustion. The urinary nitrogen was much increased. The thyroid acted, in fact, as a profound katabolic stimulant. The parathyroids produced no effects. Brdsacher (Journal of the American Medical Association, 1903, vol. lix, p. 566) states that all dogs from which the thyroid has been removed die when fed upon meat or meat broth, while 30 per cent. of the animals fed upon milk and eggs remain normal. This had led physicians to treat various diseases of the thyroid, such as myxœdema and Basedow's disease, by prescribing a diet consisting chiefly or entirely of milk, eggs, and vegetables. See, however, Ughetti (Riforma Medica, December, 1892, vol. iv., p. 675). According to Lanz (Correspondenzblatt für Schweizer Aerzte, 1895, Jahrgang xxv., p. 293) the subcutaneous injection of thyroid juice in normal animals brings about atrophy of the gland (!).

[118] Oliver and Schäfer, Proceedings of the Physiological Society, March, 1894, Journal of Physiology, vol. xvi., p. 1; ibid., March, 1895, Journal of Physiology, vol. xviii., p. 9; Journal of Physiology, vol. xviii., No. 3, 1895.

[119] With the exception of the infundibular portion of the pituitary.

[120] Oliver and Schäfer, Journal of Physiology, 1895, vol. xviii.; Osborne and Vincent, ibid., 1900, vol. xxv.; Vincent and Sheen, ibid., 1903, vol. xxix.; Vincent and Cramer, ibid., 1903–04, vol. xxx.

[121] Oliver and Schäfer, loc. cit.; Hutchison, Journal of Physiology, 1898–99, vol. xxiii., p. 182.

[122] Loc. cit.

[123] Cf. Osborne and Vincent, Vincent and Sheen, Vincent and Cramer, and Halliburton, loc. cit.; Halliburton, ibid., 1901, vol. xxvi.; Schäfer and Moore, ibid., 1896, vol. xx., p. 1; Cleghorn, American Journal of Physiology, 1899, vol. ii., p. 472; Guinard and Martin, Comptes Rendus des Séances de la Société de Biologie, 1899, p. 161.

[124] Loc. cit. See also Schäfer, Brit. Med. Jour., 1896, vol. ii., p. 343.

[125] See, however, Cunningham, Journal of Experimental Medicine, 1898, vol. iii., p. 147.

[126] Vamossy and Vas, Münchener Medicinische Wochenschrift, 1897, No. 25, S. 667; Kobert, Verhandlungen des 14ten Congresses für Innere Medicin, 1896, p. 153; see also Schüster, ibid.

[127] Mossé: Archives de Physiologie, 1898, Band xxx., p. 742.

[128] American Journal of Physiology, 1899, vol. ii., p. 287.

[129] This "Entgiftung" theory has been most definitely formulated by Blum (Münchener Medicinische Wochenschrift, 1896, Nos. 8, 9, and 11, SS. 231, 267, and 335). This author believes that the thyroid takes up the poisonous thyreotoxalbumin from the blood and renders it harmless by the addition of iodine. This view is criticised by Oswald (Pflüger's Archiv, 1900, Band lxxix., S. 450) and Roos (Zeitschrift für Physiologische Chemie, 1899, Band xxv., S. 429).

[130] Lectures, loc. cit.

[131] Philosophical Transactions, 1844.

[132] Deutsche Medicinische Wochenschrift, Leipzig, 1887, S. 227.

[133] Berliner Klinische Wochenschrift, 1887, S. 253.

[134] For details of Cyon's theory see: Centralblatt für Physiologie, 1897, Band xi., SS. 279, 357; Archiv für die Gesammte Physiologie, 1898, Band lxx., S. 126; ibid., 1898, Band lxxiii., SS. 42, 339; ibid., Band lxxiv.; ibid., 1899, Band lxxvii. S. 215. See also Académie des Sciences, 1897, tome 124, p. 1544; ibid., 1897, tome 125, p. 433; Archives de Physiologie, 1897, p. 613; Revue Générale des Sciences, 1901, p. 828, &c.

FRICTIONAL ELECTRICITY: A FACTOR IN CAISSON DISEASE.

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PERHAPS no malady presents such a number of apparently anomalous symptoms and signs as caisson disease, named also by those who work in compressed air "bends." The latter term suggests the all-flexed position which the sufferer typically assumes. Attacks may occur (*a*) in the caisson, rare; (*b*) immediately on quitting, not so rare; (*c*) some hours afterwards, usual; or (*d*) not uncommonly for two or three days after the exposure to compression. We will consider for the purposes of description a delayed case. The individual has a depressed, listless appearance, the eyes are dull and encircled by dark lines, and the skin of the face is dry, inelastic, and of a yellowish tinge. The facies is distinctive and once noted is readily recognised. Movements are slow and the sufferer complains of general malaise with slight flying pains; he lacks energy and the power of concentration. This stage may pass off, but may not, and without the person re-entering compressed air, especially if he be subjected to excessive bodily strain or mental, more acute symptoms arise preceded by a short interval of drowsiness and yawning. Following natural promptings, rest is sought; then, when the body becomes warm, instead of composure and sleep, aching commences in the back and loins, involuntary upward and forward movements of the shoulders occur, the elbow-joints become semi-flexed, with the forearms midway between supination and pronation, the hands clench themselves, while the trunk inclines forwards, the thighs bend towards the abdomen, and the legs are also flexed. The muscles of the back are thrown into tonic contraction in groups or singly. The abdominal walls become tense, accompanied by the peculiar sensation that they are describing semicircles in the air at some distance from the body. Intestinal peristalsis is exaggerated and if defæcation takes place the contents of the rectum are expelled so forcibly that the pelvic viscera threaten to follow. Emptying the bladder conveys an unusual sense of relief. These motor spasms last from a few seconds to as many minutes, and are accompanied by acute cramping pains in the joints and muscles. There is swimming in the head, with constriction at the back of the ears and in the post-temporal regions. The thoughts are scattered over wide fields and the ideas are not consecutive. These mental vagaries can be controlled by conscious effort. There is no rise of temperature; palpitation with high tension pulse is present.

The foregoing are indicative of the irritant or first stage of caisson disease and most cases do not go beyond this, recovery taking place in from two to six or eight days. The graver series of symptoms, monoplegias, paraplegias, of a transient or permanent nature, with or without loss of sensation and consciousness, are significant of the exhaustion or second stage. These are due to electrical stimulation, while other signs, such as pallor of the skin, hæmorrhagic spots, spitting of blood, rupture of the tympanum, and dyspnœa, are attributable to the direct influence of increased atmospheric pressure, although these causes may overlap and coöperate.

The work of a caissonier, which requires prolonged muscular effort, accelerating the return circulation in the muscles of the extremities and trunk, causes a repletion of the visceral veins and those of the cerebro-spinal axis. Add to this the pressure of one or two extra atmospheres upon the capillaries of the body surface and the tension is still further abnormally raised in deeper tissues. Although the cranium can only accommodate a definite amount of fluid, the spinal column and its contents are not so constituted; here the thin-walled venules, inclosed by the inelastic perilymphatics, are especially liable to become over-distended through this increased tension; this creates local pressure and interference with the nutriment of the nerve cells, owing to the accumulation of the products of metabolism in the perilymph and in the protoplasmic elements. There is local rise of acidity, which is a stimulant to the discharge of energy by these cells. This energising is probably assimilated by that required to accomplish work.

There is no reason further to believe that the accumulation of carbonic acid and the anthropotoxins (which is guarded against) has any greater effect in the caissons *per se* than it has in any other confined space where the air is not compressed, although "bends" have been ascribed to this agency. It is otherwise when the caisson atmosphere, as at present engendered, is charged with electricity, carried by the droplets of water vapour, and when the electric potential in a moderate-sized caisson may be compared in amount with that of a flash of lightning. The worker in this atmosphere accumulates upon the body surface electricity which either by directly permeating the tissues reaches, amongst others, the nerve centres, or by acting upon the peripheral nerve filaments or muscle-end plates stimulates these centres from the afferent side. Although the amount of electricity be insufficient to produce a conscious effect upon the exterior, the nerve cells are thrown into a state of excessive activity, manifesting itself in discharges of a purposeless motor and sensory nature, the "bends" or otherwise the individual becoming polarised in the caisson. When decompression in the air lock takes place, the rapid decomposition of electricity accompanying this and the fall of electric potential cause a similar effect.

But why should the nerves which control the flexors be specially affected? They are not so, but these form a greater and more highly organised part of the nervous system than the areas which subserve extension, and the excitant being equal and general the flexion manifestations are thus the greater. The personal equation is an important factor, as in some individuals an exposure to an extra pressure of 12 pounds per square inch for an hour is sufficient to cause an incidence of caisson disease; in others exposure to the compressed air for 40 minutes at 18 pounds added pressure has been followed by an attack.

The electricity of the caisson atmosphere is hydro-electric in origin, and the means at present in vogue of compressing and conducting air into the workings is an enlarged continuous performance of the Armstrong-Faraday experiment, with moist air instead of steam. That this is so, without going into the full details of the steam or dynamo compressing engines, the following details show. Ordinary atmospheric air is sucked in through valvular openings and is simultaneously compressed and propelled along 15, 20, or 30 feet of plain metal tube into the cooling tank, and it is in this tubing that the electricity is chiefly generated by the friction of the more or less moist air against its walls. The effect of this is to produce so great a rise of temperature, even at 12 pounds added pressure, that it is impossible to place the hand upon the outside for more than the fraction of a second, while a greater compression causes, roughly speaking, a correspondingly high degree of temperature. Reaching these tanks, which are large iron cylinders immersed in cisterns and with cold water flowing over them from above, the air is cooled and passed on by metal tubes of varying diameter to the workers. After cooling, the electrical changes taking place in the air are unimportant, but obviously two molecules of air at 15 pounds added pressure or three at 30 pounds pressure occupy the space of one molecule of atmospheric air; this, which at ordinary temperature and pressure is a feeble conductor to electricity, obtains under pressure a heightened conducting power. This power is greater if the air be humid, as after rain, and still more so if the humidity be constant, as at sea or riverside working. That this reasoning is not merely theoretical has been demonstrated by a Kelvin galvanometer, for when the same men were tested before going into the working and an hour after being there the deflexions of the mirror were in all cases much increased in the latter. These observations were made upon men some of whom were labouring and upon some who did not perform any manual work. With a gold-leaf electroscope, after a slight primary divergence, the leaves folded together and remained stationary, refusing to respond to either positive or negative stimulation. During these observations care was taken to exclude fallacies as far as possible.

As a conclusion to the above, in order to hinder or to minimise this generation of electricity in the process of compression, it would appear that the air allowed to enter the intake of the compressor should be absolutely dry. This result might be obtained by its passage through heated tubes arranged in a furnace like those of locomotive engine boilers or one of the heat economisers in general use.

For small quantities of air chemical agents, such as calcic chloride or sulphuric acid on pumice stone, might be employed but the expense and difficulty of working with these prevent their application in dealing with large quantities. If impossible to dry the air another means of modifying the generation of frictional electricity would be to line the conducting iron tube, at least as far as the cooling tank, with non-electrical material, such as asbestos packing, earthenware, or highly vulcanised vulcanite, while the ends of the compressing pistons and their receivers should either be of a non-metallic substance or capped with such. Drying air, however, is the method which commends itself for saving expense, as water vapour expanding into steam offers a marked opposition to compression. One drawback to this drying process is that perfectly dry air is irritating to the lungs, eyes, and other exposed mucous membranes, so that before being distributed to the caissons it would be necessary to let it lick up moisture either by bubbling through or passing over the surface of water in a tank placed near the inlets. Passing through water would be the better means because impurities would be washed out thereby.

With regard to the various views expressed as to the causes of caisson disease, it is difficult to explain an attack occurring in a man after 70 minutes' exposure to 18 pounds added pressure by one that attributes the malady to the escape of bubbles of free nitrogen into the blood, the gas having previously been dissolved therein, and still more so when the incidence is delayed by two and a half days after the exposure. Again, ponies are employed for eight hours daily in pulling wagons in the caissons, and despite their relatively large lungs and cranial air spaces they do not show symptoms attributable to disengagement of nitrogen bubbles, which would naturally be expected were "bends" due to a solution and a subsequent dissolution of this gas in the circulating fluids, but this immunity is explicable by their thick hides being able to resist the effects of compression, while their hairy coverings act as non-conductors of electricity.

Bubbles of air may be demonstrable in the tissues of frogs which have been placed under increased atmospheric pressure, but it is not logical to conclude that the same will apply to man, because in amphibians the skin possesses a respiratory function, while under it lie the sub-epidermal lymph sacs, inflatable potential spaces, forming a direct route for the passage of gas into their blood. In mammals, when the blood is normally aerated, it seems physiologically impossible to bring the respiratory interchanges under the dictum of Dalton's law, and what is claimed with regard to caisson disease as due to the absorption and defervescence of nitrogen gas under compression and subsequent decompression is quite explicable by a rise and rapid fall of electric tension. In attacks of caisson disease where paralysis, coma, and death occur, and where, on post-mortem examination, rents or other gross lesions are present in the substance of the spinal marrow or brain, these are probably caused by rupture or the pressure effects of the over-distended perilymphatics, this over-distension being, as already indicated, attributable to the combination of pressure upon the body surface and to the effect of muscular action upon the circulation. There is great similarity between the symptoms of a non-fatal lightning stroke and an attack of caisson disease, while the return shock of lightning is physically comparable to the changes which follow a too rapid decompression after long exposure in the caisson atmosphere. From this reasoning the use of a medical lock for recompressing the patient is therapeutically rational, while under this category cannabis indica, salicin, salicylates and allies, from their known sedative and analgesic effects, are to be placed.

Thanks are due to Messrs. Walter Scott and Middleton, the contractors of the Euston Extension, Central London Railway, for their permission to make observations.

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ANALYSIS OF TINNED MEAT.—The Wiltshire county council, at its meeting held on August 8th, approved of the action of the county medical officer of health in declining to undertake analysis of samples of tinned meats submitted to him by the direction of the Bradford-on-Avon urban council. The county council considers that the protection of the public against tinned meat which is unfit for food is a matter within the jurisdiction of the urban council, and that no action on the part of the county council is called for.

OBSERVATIONS ON THE ACTION OF STRONTIUM SALTS ON THE COAGULABILITY OF THE BLOOD.

BY J. B. NIAS, M.D. OXON., M.R.C.P. LOND.

THE following observations were made in the Pathological Laboratory of St. Mary's Hospital at intervals during the past year by the kind permission of Sir A. E. Wright, and were mainly carried out on a patient under his care whom I was allowed to examine with considerable frequency. They are intended to supplement a paper which appeared in THE LANCET of Oct. 14th last by Sir A. E. Wright and Dr. W. E. Paramore on the Therapeutics of Blood Coagulation, and another which appeared in the following number by Sir A. E. Wright and Dr. G. W. Ross on the Action of Calcium and Magnesium Compounds in the Treatment of Physiological Albuminuria. The observations recorded were for the most part simultaneous in point of time with those of Dr. Paramore, he taking the action of calcium and magnesium and I that of strontium by agreement, so as not to interfere with one another.

The patient on whom I made these observations is a sufferer from hæmophilia, for whom it became desirable to find a drug as a substitute for calcium, as repeated observation by Sir A. E. Wright and myself established that in his case calcium salts were not absorbed when administered by the mouth. This is a detail which seemed to me worth working out in the interest of general therapeutics, as it is probable that there are other drugs with regard to which similar disabilities may exist and have to be overcome. I therefore took considerable pains to establish the fact in the present instance and in this I think I have succeeded, the result of my observations being to prove that the subject in question can absorb with facility, when they are given by the mouth, the soluble salts of strontium and magnesium while refractory to those of calcium.

The condition for which it was required to improve the coagulating power of this man's blood is a periodical oozing of blood from the alveoli of some of his teeth with which it does not appear safe to deal surgically. Generally the time taken by his blood to coagulate in a Wright's capillary tube is two and three-quarter minutes or so at blood heat, the normal for that temperature being two minutes or rather less. At times he suffers from an attack of boils and then the extra amount of nucleo-proteid circulating in the blood has the effect of raising its coagulability to the normal or above, and the hæmorrhage is then suspended, to recur again on convalescence as the coagulating power falls. Sir A. E. Wright has tried to obtain a similar result artificially with such substances as peptone and thymus gland but only with moderate success, and the desideratum therefore seemed to be to furnish the patient with a drug that would have a prompt effect when taken by the mouth whenever a hæmorrhage came on without waiting for the time to visit the hospital. In this direction some advantage has been gained by means of the present research.

After it had been established that the patient could not absorb calcium salts by the mouth the idea occurred to me that a compound of greater molecular weight but otherwise possessed of the same properties would be indicated for trial, as presumably traversing a mucous membrane more easily; and my attention therefore turned in the first instance to strontium, of which the molecular weight is to calcium as 87 to 40; but inasmuch as subsequent observation showed that the patient absorbed equally well the salts of magnesium of which the molecular weight is only 24 I fear that the hypothesis has no foundation. Nevertheless, as the starting point of the present investigation it requires to be mentioned; but I am not able at present to throw any further light on the cause of this curious and, I think, generally unrecognised condition that an individual should be able to absorb with facility two only out of three closely allied metals when by the generality of persons all three are equally easily absorbed. As I have said, such a peculiarity may obtain in other cases, and as a matter of fact another instance of the same kind is recorded in the paper of Wright and Paramore in the person of an individual, under the

initials A. E. W., who can absorb the salts of magnesium but not those of calcium.

Among the salts of strontium the bromide, of course, has had considerable vogue in epilepsy and other occasional uses of the metal are recorded in pharmacological literature; but no definite mode of action or the possession of any particular activity by strontium as a base seems as yet to be recognised by medical practitioners. Yet Arthus and Pagès in their classical work on the process of coagulation expressly state that strontium salts will replace those of calcium in restoring its coagulability to oxalated blood.[1] No one seems, as I say, to have ascribed to this palpable activity the medical benefits asserted to have been obtained by the use of strontium. The authors referred to curiously enough deny a similar property to magnesium, a statement which in the face of Wright and Paramore's results can only have a partial application. They say: "Les sels de strontium peuvent comme les sels de calcium produire la coagulation. Les sels de barium et de magnesium sont impuissants à faire coaguler le sang decalcifié." To Wright and Paramore, as far as I can see, belongs the merit of first demonstrating that an important effect of magnesium when absorbed into the system is that of increasing the coagulating power of the blood, the statement of Arthus and Pagès being either a slip of the pen or only applicable to the blood of animals with which they worked. In the case of milk[2] they say, on the other hand, "Les sels de barium et de magnesium par exemple se comportent comme les sels de calcium." By employing one of Wright's methods it is easy to demonstrate that if blood drawn from the finger be mixed with just enough of a solution of ammonium oxalate (in physiological salt solution) to prevent coagulation and then a little of this mixture be aspirated into a capillary tube with a fragment or two of a calcium or magnesium salt, coagulation will set in as rapidly with the magnesium as with the calcium. Strontium shows a similar but decidedly weaker action, often allowing a partial subsidence of red corpuscles before the clot forms, and barium I have not noticed to have any activity in this direction at all.

An important practical application of the strontium salts in medicine was made in the year after the publication of Arthus and Pagès's research but without apparently any attribution of the results obtained to the properties which they had demonstrated. In 1891 Dujardin-Beaumetz and others in Paris gave an exhaustive trial to the action of lactate of strontium in cases of albuminuria, instigated thereto by Laborde who had shown the harmlessness of strontium salts on dogs. In Vol. XIV. of the *Progrès Médical* (1891, pp. 313, 409) will be found abstracts of communications made to the Société de Thérapeutique with regard to this point, from which it appears that lactate of strontium given in doses up to six grammes per diem will produce a great diminution in the amount of albumin excreted in cases of "parenchymatous and desquamative nephritis, but not in the interstitial form." This treatment seems to have been subsequently abandoned and certainly has never come into general use, perhaps from proving only palliative and still more I imagine because no intelligible mode of action was assigned to the drug by the experimenters. On this point they all express themselves very vaguely. Later still, Ried is quoted in THE LANCET of Oct. 27th, 1894, from the *Centralblatt für Gesammte Therapie*, as having found that "lactate of strontium, which is certainly an excellent diuretic, is beneficial in a large proportion of cases of Bright's disease, at all events when no sclerosis of the kidney has taken place," but he too only vaguely conjectures its mode of action. Yet, as confirming the more advanced results of Wright and Ross with regard to physiological albuminuria, these bygone empirical observations have their value and ought to stimulate fresh workers to the elucidation of an important problem.

I must now pass on to the record of my own experiments with the lactate of strontium which, beginning in the early part of last year, have been continued up to the present as opportunity offered.

1905. Feb. 8th.—The patient at this date was suffering from daily oozing of blood from his gums. After the coagulation time of his blood had been found to be 2 minutes 16 seconds, he took a dose of four grammes of calcium lactate, an amount sufficient to produce a decided effect on most persons; but after 40 minutes, when the coagulation time was estimated again, no change could be detected. On Feb. 10th the coagulation time was two minutes 30 seconds; and therefore no effect remained from the previous dose (compare this with the figures of Wright and Paramore, *loc. cit.*). The strength of oxalate solution required in equal quantity to inhibit coagulation according to Wright's standard was $\frac{1}{1750}$, so that there was no actual deficiency of lime in the blood but the object in view was to force it above the normal. Another line of treatment was adopted for the time being as the patient continued to bleed. On Feb. 17th the patient was found to be no better and his coagulation time had receded to 2 minutes 50 seconds. Four grammes of calcium lactate were again given and again 45 minutes later no improvement could be detected in the coagulating power. On Feb. 24th the coagulation time was still longer—namely, three minutes. At 6.15 P.M. an injection of half a gramme of calcium lactate in salt solution was made into the flank. The coagulation time was then taken every five minutes so as to ascertain the rate of absorption; 30 minutes after the injection it began to shorten, at 7 P.M. reaching 2 minutes 15 seconds, and at 7.15 two minutes precisely. At this figure it remained to the end of the observation, the rapid improvement minute by minute being very interesting to watch. On March 15th the patient was somewhat better as regards the oozing of blood. Two grains only of calcium lactate were injected hypodermically, an intermediate injection of ten grains having apparently got into dense fascia and produced local coagulative effects, ending in great pain and collapse. Most certainly this risk attends all hypodermic injection of coagulative salts. The small quantity given on the present occasion without any injury was sufficient to reduce the coagulation time in the course of one hour from 2 minutes 35 seconds to 2 minutes 5 seconds and thus it became clear that the obstacle to the entry of lime salts into this man's blood resided in his alimentary canal. It was at this point that the idea was conceived of looking for an alternative drug and for the time being Sir A. E. Wright put the patient on thymus gland, which had previously been found useful. By July 21st, having become acquainted with the pharmacological literature of strontium, I obtained a supply of the lactate and began experimenting on myself. On this date, my blood coagulating in 2 minutes 5 seconds, I took one gramme at 4.15 P.M. By 5.15 the time of coagulation was reduced to 1 minute 30 seconds, but by 6.45 it had again increased to 1 minute 50 seconds and at 7 P.M. had reached the original figure of 2 minutes 5 seconds, thus showing that the effect of strontium, though typical and decisive, has a certain fugitive character, not so marked in calcium and magnesium. Possibly this is due to the fact that strontium is not a normal ingredient of the blood; but this fugitiveness is not always to be noted, as will be seen hereafter, nor can I exactly specify the conditions under which it appears. On July 24th I took a smaller dose—two thirds of a gramme of strontium lactate. At 6 P.M. my coagulation time was 1 minute 45 seconds, by 6.40 this had been reduced to 1 minute 10 seconds, and an hour later, at 7.40, had begun to recede again, being 1 minute 20 seconds. The observation was here stopped for dinner and I may say that observations of this detailed character have to be limited to the time between meals or changes of occupation if they are to have any value. On August 14th my time was rather longer than usual—namely, 2 minutes 20 seconds. At 6 P.M. half a gramme only of the lactate was taken and at 6.50 the time had become reduced to 1 minute 45 seconds, extending again by 7.20 P.M. to 2 minutes exactly. For practical purposes it was deduced from these experiments that a proper dose would be from one to two grammes. On August 23rd the first opportunity occurred for testing Sir A. E. Wright's patient with the lactate of strontium. He had now for some months been taking 35 grains of thymus extract daily and was consequently in much better condition, though not altogether exempt from hæmorrhage. At 4.30 P.M., when his coagulation time had been found to be 2 minutes 35 seconds, he received one gramme of strontium lactate and at 5.30 the coagulation time had become reduced to 1 minute 55 seconds, at which it remained to the end of the observation. An improvement of 30 per cent. in coagulating power at the first trial was a welcome contrast to the experiences with calcium. A considerable interval here elapsed owing to my holidays. On Nov. 8th the patient's blood was found to coagulate in 2 minutes 50 seconds and at 4.10 P.M. he had a dose of two grammes of the lactate. By 4.50 the

[1] Archives de Physiologie Normale et Pathologique, 1890, p. 742.
[2] Ibid., p. 339.

time was reduced to 2 minutes 5 seconds and at 5.20 to 1 minute 50 seconds, when the observation terminated. Again an improvement of 30 per cent. recorded. Nov. 15th.—The joint paper of Wright and Paramore having now appeared and their results therefore available, I thought I would try a comparative test with magnesium, choosing the lactate as preferable for a rapid effect in the place of the more insoluble carbonate. On this occasion the patient's blood coagulated in three minutes exactly. At 4.15 two grammes of the lactate of magnesium were given and by 4.50 the coagulation time was reduced to 2 minutes 25 seconds, and further by 5.20 to 2 minutes 10 seconds. It appeared then that magnesium acted as well on this patient as strontium, producing also an improvement of nearly 30 per cent. Dec. 13th.—As the result of occasional doses of magnesium carbonate prescribed by Sir A. E. Wright the patient had improved perceptibly. An oxalate test showed a strength of $\frac{1}{1500}$ as required to inhibit coagulation. The lactate of strontium was again tried on this occasion, a dose of one gramme being given at 3.50 P.M.; the coagulation time was then 2 minutes 50 seconds. By 5.20 the time had been reduced to 2 minutes and at 6 P.M. to 1 minute only. This excellent result of an improvement of 60 per cent. for the time being in the coagulating power was apparently due to the longer continuance of the present observation and might possibly have been before recorded if the times available had allowed. No fugitiveness in the effect was to be noted on this occasion; I cannot say why. On Dec. 20th and Jan. 3rd and 5th of the present year fresh trials were made to reaffirm the inability of this patient to assimilate calcium; the results were exactly as before, at the most on the third occasion an improvement of 15 seconds being noted after the lapse of three hours, after a dose of two grammes of calcium lactate. The treatment of hæmophilia not being the special object of this paper I need not detail the further observations made on this man except to say that he has of late been supplied with powders of strontium or magnesium lactate for self-administration in emergencies and as a result he has been able to report to me on more than one occasion that hæmorrhages have ceased within 12 hours instead of going on for days. Perfect success, however, is not always obtained, as might be expected with such a difficult pathological condition to contend with, but it may be affirmed that something has been accomplished for his comfort so far.

Conclusion.—From these experiments I think it is clearly established that the lactates of both strontium and magnesium in doses of from one to two grammes are serviceable substitutes for the salts of calcium when the latter are not absorbed from the alimentary canal, thus enabling us to dispense with the dangerous practice of hypodermic injection which my experience does not show to have any advantage in speediness of action.

These observations also, I think, enforce the old lesson of the complexity of vital action with which the physician has to contend and show how the recognition of minute differences and the mastery of minute details must not be avoided if one wishes to triumph in a difficult art like medicine. I hope to see someone else with the requisite opportunities taking up the question of albaminuria and its treatment with these coagulative salts, when probably other differences in their action will be demonstrated.

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A NOTE ON THE STRUCTURE OF SPIROCHÆTA DUTTONI.

BY J. W. W. STEPHENS, M.D., D.P.H. CANTAB.,
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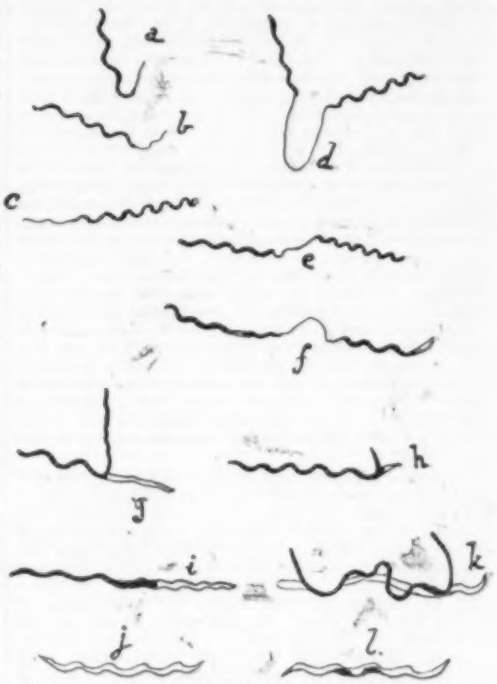
WHILE engaged in investigating some of the methods in use for staining bacterial flagella I was led to apply these methods to the staining of the spirochæta of African tick fever. It will be unnecessary here to review the results obtained with other spirochætæ by other observers, as these questions will be fully dealt with shortly by Dr. J. L. Todd and Dr. A. Breinl, to whom I am much indebted for a plentiful supply of material. The difficulties of applying the silver method of staining flagella described by me in the Thompson-Yates Laboratory Reports for 1903, Vol. V., Part I., to spirochætæ contained in an albuminous fluid like blood plasma are so considerable that I abandoned this method after many unsuccessful attempts to wash the spirochætæ by centrifugalisation sufficiently clean to get good preparations. I, however, succeeded by this method in demonstrating in some specimens a terminal flagellum.

Another method, as yet unpublished but similar in principle to Löffler's method, has given me beautiful results with different bacterial flagella. It is the results obtained with this method that I think are of interest. Here again the spirochætæ were centrifugalised and washed in normal salt solution three or four times. Films were then made of the sediment and after mordanting stained with gentian violet. The forms observed under an ordinary oil-immersion objective were the following: 1. Forms showing a terminal flagellum (*a*, *b*, *c*). So far I have not found a flagellum at each end or any indication of peritrichous flagella. 2. "Linked" forms (*d*, *e*, *f*)—i.e., two ordinary spirochætæ joined by a thin intervening portion resembling the flagellum in appearance but of very variable length. 3. "Eviscerated" forms (*g*, *h*, *i*, *k*), probably due to mechanical and chemical action. Many of these forms were seen. They presented two portions: (1) the partly or even completely eviscerated "core" often of a peculiar rigid appearance staining deeply and uniformly; and (2) the faintly staining remaining "sheath" still retaining the undulations of the normal spirochæta. Not uncommonly faintly staining "sheaths" (*j*, *l*) were found devoid of any core but I have not observed an empty sheath with a flagellum attached to it. These terms I use in a purely descriptive sense; their interpretation I must leave to those engaged in the special study of spirochætæ. It seems to me, however, that these forms, especially the "eviscerated" ones, have considerable bearing on the question of the bacterial or protozoan nature of spirochætæ.



Diagrammatic representations of various forms of spirochæta Duttoni: *a*, *b*, *c*, Spirochætæ showing a terminal flagellum. *d*, *e*, *f*, "Linked" forms. *g*, *h*, *i*, *k*, "Eviscerated" forms. *j*, *l*, Empty "sheaths."

Liverpool.

UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL.—Mr. F. H. M. Parker, M.A. Oxon., barrister-at-law, has been appointed secretary to University College Hospital Medical School.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF MITRAL STENOSIS; DEATH FROM EMBOLISM OF SIX MAIN ARTERIES.

BY RICHARD S. ROPER, M.R.C.S. ENG., L.R.C.P. LOND.

A MAN, aged 27 years, was admitted to the St. Marylebone Infirmary on Oct. 26th, 1905, suffering from cardiac disease and bronchitis. He had had rheumatic fever twice. On admission he complained of cough but otherwise seemed in fair health. On examination there were a few râles and rhonchi scattered over both lungs. The cardiac area of dulness was increased and on auscultation well-marked systolic and mid-diastolic bruits were heard at the apex. No other bruits were heard. The pulse was regular and of good volume. The liver was not enlarged, neither was there any ascites, œdema, or other sign of failing compensation. The patient was kept in bed for a month and as at the end of that time all physical signs in the lungs had subsided he was allowed up and by Dec. 7th was up all day.

On Dec. 7th, at 4.45 P.M., while in the day-room the patient suddenly became very ill and was at once removed to bed. When examined he was blue, pulseless, cold, and clammy, and was struggling vigorously, and at the same time complained of great pain in his legs. The heart was beating regularly and at normal rate but no bruits could be heard. At 7 P.M. the general appearance of the patient was much the same and the condition of collapse was very little improved. He still complained of great pain in the knees and abdomen. Neither tibial pulse could be felt nor was there any pulse at the left wrist. The left femoral artery could be felt pulsating just below Poupart's ligament. Both lower limbs and the left arm were paralysed. There was anæsthesia of the legs as far up as Poupart's ligament. The abdomen was slightly distended. At no time was he unconscious and his mental condition was quite clear. A sixth of a grain of morphine acetate was given and at 10 P.M. he had somewhat recovered and had less pain. At this time his face was a natural colour, the collapse had passed off, and he was warm. He was still unable to move his left arm but motor power and sensation had returned to the lower limbs. The right radial was the only artery felt pulsating in the limbs. The abdomen now was very distended and a copious blood-stained motion was passed. Several ounces of blood were passed per rectum until death, which took place at 4 A.M. on Dec. 8th.

A post-mortem examination was made seven hours after death. There was hypertrophy of the left auricle and ventricle with marked stenosis of the mitral orifice. The latter just admitted the tip of one finger. Recent vegetations were present on the inner wall of the left auricle of the size of a pea. No ante-mortem clot was to be seen. The small intestines were distended and anæmic. Embolism of the following arteries was found: both common femorals, with ante-mortem clot extending as far as the popliteal artery; the right internal iliac at its bifurcation; the right renal at its division; the superior mesenteric just below the middle colic branch; and the left brachial at the origin of the superior profunda. No other pathological condition was found in any organ.

I am indebted to Mr. J. R. Lunn, medical superintendent, for permission to publish this case.

Notting Hill, W.

A CASE OF LEUKÆMIA SUCCESSFULLY TREATED WITH ARSENIC.

BY FRANK LINDSAY DICKSON, M.B., CH.B. GLASG.

THE patient in the following case was a man, aged 24 years, who came to me on May 30th complaining of pain in the back, slight headache, and general debility. His temperature was 99·6° F. and I gave him a saline mixture with orders to rest for a few days. He returned three days later and stated that the pain in the back was better but that he felt very weak. His temperature was normal and I treated the case as debility following influenza, prescribing compound syrup of the hypophosphites and cod-liver oil. At the same time I noticed a slight swelling of one of the deep cervical glands. This was hard, freely moveable, and quite painless. The patient then took to his bed, there being great prostration. The glandular enlargement increased until the swelling was of about the size of a hen's egg. His temperature remained normal and there was no improvement in his general condition.

On the evening of June 6th I found that the inguinal, right axillary, and post-cervical glands were slightly enlarged; the splenic area of dulness was slightly increased and pain was induced on pressure over that organ. I was inclined to diagnose the case as one of pseudo-leukæmia, true leukæmia to be left for consideration after examination of the blood, for which purpose I sent him to the Queen's Hospital, Birmingham. The patient was seen by Dr. J. G. Emanuel, who afterwards told me that he was inclined to regard the case as one of mild enteric fever. A blood film was, however, taken and on the next morning I received from Dr. Emanuel a letter from which the following is an extract: "There is a great excess of leucocytes and lymphocytes, the latter predominating. I regard it as being one of those rare cases of acute or subacute lymphatic leukæmia. I expect it will terminate fatally in a few weeks." I examined the blood myself on the following day and found that the white cells were almost as numerous as the red ones. I then commenced to administer liquor arsenicalis, giving five minims three times a day, and the result seemed almost miraculous. After three days the patient "felt much better in himself," the glandular swellings were noticeably less, and I found that there was marked improvement in the condition of the blood. The dose of liquor arsenicalis was increased rapidly until 15 minims were being taken thrice daily, the improvement continuing and no toxic symptoms being produced by the drug. The patient had one attack of epistaxis which weakened him a little; he had, however, been subject to these attacks from childhood. About a fortnight later the glands were practically normal and the blood was, in my opinion, in a like condition. Dr. Emanuel came to see him after I had written my opinion on the subject and took half a dozen films of the blood. His next letter said that "the blood is practically normal."

The dose of arsenic was gradually diminished and on July 6th the patient went to the seaside for a fortnight, taking with him sufficient medicine to last him till his return. I gave him iron in addition to the arsenic as the red blood corpuscles needed a little recruiting. On his return he told me that he felt as well as ever he had done in his life. Two days later he returned to his work as a carpenter and he has remained perfectly well ever since. The only predisposing cause was that some time before the commencement of the illness he had been working about some water-closets of which the drains were obstructed and the odours not ambrosial.

Hay Mills, Birmingham.

A CASE OF RUPTURE OF THE GRAVID FALLOPIAN TUBE.

BY N. J. F. VAZIFDAR.

THE patient was an ayah, aged 25 years, who was admitted into the Sir Jamsetjee Jeejeebhoy Hospital in Bombay on Dec. 9th, 1905, for acute intestinal obstruction. The history of her illness was that on Dec. 6th, whilst micturating, she was suddenly seized with an acute pain in the abdomen after which she vomited and fainted. The pain and vomiting increased and on the 8th the vomited matter became fæcal. There was absolute constipation in addition to which no flatus had been passed since the 6th. On admission she was in a collapsed condition. Her temperature was 97° F., her pulse was 146 per minute and very weak, and her respirations were 48 per minute; the abdomen was much distended all over, tense and hard on palpation, and tympanitic on percussion. There was almost continuous fæcal vomiting. The case being diagnosed as one of acute intestinal obstruction, probably due to a volvulus, a median laparotomy was immediately

performed by Lieutenant-Colonel W. H. Quicke, I.M.S., the senior surgeon of the hospital. The abdominal cavity was then found to be full of dark blood and blood clots, and further examination revealed a rupture of the right Fallopian tube at its isthmus. The tube was tightly ligatured at its uterine junction, the broad ligament was also ligatured *en masse*, the whole tube with the ovary was removed, and the abdomen was sutured after being flushed with hot normal saline solution. An intravenous injection of 24 ounces of normal saline solution had to be given. The ruptured fœtal membranes with slender chorionic villi were found among the blood clots. The patient was in a very precarious state and had to be supported on stimulating injections for three or four days. She then gradually improved and was discharged recovered on Jan. 29th, 1906.

A very remarkable fact in the case was that the patient on admission showed all the signs and symptoms of acute intestinal obstruction, including extremely severe fæcal vomiting, and the history of her illness as given at the hospital did not contain any clue to its real nature. Owing to the enormous distension of the whole of the abdomen no localised swelling could be distinguished. There was even a history of the patient having a normal menstrual period a week before the illness.

This is the third case of rupture of the gravid Fallopian tube at the end of the fifth week which has been admitted into this hospital during the last two years. All these patients had symptoms and signs pointing most distinctly to intestinal obstruction; and they all had constipation of three or four days' duration, fæcal vomiting, and great distension of the abdomen.

I have to thank Lieutenant-Colonel Quicke for permitting me to report the case.

The Sir Jamsetjee Jeejeebhoy Hospital, Bombay.

A Mirror
OF
HOSPITAL PRACTICE,
BRITISH AND FOREIGN.

Nulla autem est alia pro certo noscendi via, nisi quamplurimas et morborum et dissectionum historias, tum aliorum tum proprias collectas habere, et inter se comparare.—MORGAGNI *De Sed. et Caus. Morb.*, lib. iv., Proœmium.

KIDDERMINSTER INFIRMARY.

TWO UNIQUE CONGENITAL DEFORMITIES IN THE ABDOMEN OF THE SAME PATIENT.

(Under the care of Mr. J. LIONEL STRETTON.)

A BOY, aged five years, was admitted to the Kidderminster Infirmary on July 14th last. He suffered from pain in the abdomen. He vomited some curdled milk soon after admission but after this he retained the milk given to him. His mother stated that he had suffered from pains in the abdomen and occasional vomiting since birth. His bowels were always very constipated. On examination it was noted that he was very thin and emaciated. The abdomen was retracted. On inspection a lump swelled up and became visible in the epigastric region about an inch above, and to the right of, the umbilicus. Vermicular action of the intestine was seen from the right iliac region up to this lump. On palpation the lump could be easily felt; it was about two inches in diameter and of an ovoid shape and could be grasped between the thumb and fingers without causing pain. In the left iliac region some small indurated masses were felt resembling enlarged glands. Per rectum the finger passed in easily. At a point about three inches from the anus a sharp, sickle-like band was felt, apparently attached to the anterior wall of the pelvis and impinging on the rectum, and though not interfering with its calibre it would probably do so if the bowel was loaded. Examination of the chest discovered nothing abnormal. The pulse and temperature were normal. An enema was administered and brought away a quantity of small, scybalous masses. Examination of the abdomen after this failed to discover the small indurated masses in the left iliac region that had been mistaken for glands. The patient was given small quantities of milk which were retained. The most probable diagnosis appeared to be tuberculous peritonitis with partial occlusion of the transverse colon.

On July 17th, under ether, an incision about two inches long was made in the left linea semilunaris from the level of the umbilicus downwards. No evidence of tubercle was discovered. The band in the pelvis appeared to be a fold of peritoneum running along the whole of the anterior surface of the pelvis and projecting backwards about one inch. The lump in the epigastric region was felt to involve the pylorus. A second incision was made running upwards from the umbilicus in the middle line about two inches in length. The lump was then lifted out of the abdomen. It was found to consist of an enlargement of the cardiac end of the stomach close to the pylorus. The transverse colon was closely adherent, which caused a loop and would interfere with the free passage of its contents. The lump appeared to be connected with the walls of the stomach; it was ovoid in shape, about two inches in diameter, and tense and elastic. As the nature of it was uncertain it was decided to explore it. After separating the colon clamps were applied on either side and a longitudinal incision was made over it on its anterior aspect. About three drachms of clear serous fluid immediately escaped and the finger entered a cyst which had no communication with the stomach or intestine. The cyst wall was found to be attached to the muscular wall of the stomach. It was situated between this and the mucous membrane which it had pushed downwards. It was very intimately attached posteriorly, above, and in front. How much it had occluded the pylorus it was impossible to say as the fluid had escaped before the nature of the enlargement was discovered. An endeavour was made to dissect off the wall but it was so adherent that it was impossible to avoid penetrating the walls of the stomach and it was necessary to excise this portion. The ends were united with silk sutures and the abdominal wounds were closed. The patient suffered from considerable shock, after which he improved for a day or two, but died early on the 21st from exhaustion.

The specimen was sent to the Clinical Research Association and it reports as follows: "From the naked-eye appearance and microscopic structure of this cyst wall we can form no definite opinion as to its origin. It is composed of closely felted fibrous tissue which is smooth on one surface but entirely devoid of any epithelial covering. Externally there is loose cellular tissue and interlacing bundles of unstriped muscle. From the youth of the patient it is probable that the cyst is of congenital origin."

Necropsy.—Post-mortem examination showed some recent peritonitis. The anastomosis was quite secure. The crescentic band felt on the anterior wall of the pelvis consisted of a peritoneal fold projecting backwards from the posterior surface of the bladder and ending in a horn running up on each side wall of the pelvis just posterior to the position of the ureters. It stood out one and a quarter inches at the centre, gradually diminishing as it approached the sides. There was a second less marked peritoneal fold along the upper surface of the bladder.

Remarks by Mr. STRETTON.—I can find no record of either of these conditions. Of the cyst I can offer no further explanation than that given by the Clinical Research Association. A congenital cyst in this situation must be exceedingly rare, if, indeed, it has ever before been found. The fold of peritoneum was no doubt an unusual development of the sacro-genital fold so well depicted in Professor D. J. Cunningham's "Text-book of Anatomy" (Figs. 822 and 823). Although always present, I have never before been able to feel it per rectum and so far have not heard of it being felt. In this opinion I am strengthened by a letter from Dr. D. Waterston of the University of Edinburgh who, in answer to a question from my house surgeon, Mr. W. A. Wilson-Smith, says: "I have often wondered if it could not be felt per rectum but yours is the first instance to my knowledge." Both the conditions, therefore, appear to be worth reporting and it is a curious fact that they should have been found in the same abdomen.

DONATIONS AND BEQUESTS.—The late Mrs. H. Finnie has bequeathed £2000 to the Clevedon (Somerset) Convalescent Home and her executors have allotted the sum of £1000 to the Royal Sea Bathing Hospital, Margate, for the endowment of the "Hannah Finnie memorial bed."

Reviews and Notices of Books.

The Scientific Temper in Religion, and Other Addresses. By the Rev. P. N. WAGGETT, M.A., of the Society of St. John the Evangelist. London: Longmans, Green, and Co. 1905. Pp. xii.-286. Price 4s 6d. net.

THE charming series of addresses delivered at various times in the form of sermons by the Rev. P. N. Waggett and now published as a book of essays under the general title of the "Scientific Temper in Religion" should be read by all thoughtful and philosophically minded men, and will especially appeal to members of the medical profession. The essays form no *apologia* to the Christian for his religion; they contain no polemical criticism of the tenets of science, and offer no presentation of the supposed antagonism between science and religion; they constitute rather a thoughtful and suggestive plea for mutual understanding, respect, and assistance on the part of these two great schools of thought and action.

In the introductory chapter Father Waggett points out that in what he terms "the upper regions of educated life" there is at the present time a pause in the controversy, making a good opportunity for mutual adjustment of differences. He terms this pause happily a "truce by estrangement" and he suggests that the cause of the cessation of hostilities is threefold. Firstly we have the readjustment of thought on the part of orthodoxy, whereby many religious statements are differently expressed and explained; secondly, we have the vigorous condition of natural science, its broader field of work, and the greater caution incidental to the increased broadness of view; and thirdly, the fact that the Church has been fully occupied with its own problems, notably in regard to the results of critical research and the Ritschlian theology. This last circumstance is well put by Father Waggett in the following sentence: "Men are much too hard at work in adjusting our new ideas of what religion is with the old words which already enshrine them to be keenly interested about dangers supposed to arise from friction between the Bible record and the discoveries of natural science." The result of this preoccupation of science and religion each with its own problems has been that each has advanced on its own lines ignoring the other in a spirit of despair of reaching agreement or coincidence. What is needed is a better mutual understanding, or again to quote from the volume under notice: "If in science we need and welcome a spirit and a method of patience, on the side of religion we need and ought to show a more truly scientific temper." Father Waggett points out that science and religion do not progress along coincident or even parallel lines but rather in converging directions; it is therefore not to be expected that they should entirely agree or even be able to express their tenets without discrepancies, but since both are advancing each should regard the work of the other with reverence, patience, tolerance, and moderation.

The second address is that which gives its title to the book, and in it the scientific temper in religion is defined, not as an attempt either to conciliate the statements of religion and science or to establish religion as a department of natural history, but as a desire to adopt the wide outlook, the adventurous spirit, and the positive temper of the highest scientific workers. Father Waggett shows the breadth of his views, and illustrates his contentions admirably, in the analysis he gives of the methods of science and in the application of these methods to the problems of religious experience. He refers to the adventurous spirit of science in speculative and theoretical fields and to the solid advance which the experimental testing of theory and hypothesis has led to; in illustration he refers to the great conceptions of natural selection and of the Mendelian theory of heredity, both of which have led to the discovery of new facts. He next refers to the adventure of science in actual discovery, the search with an open mind for new facts; and thirdly, to the excellent discipline of science, in which even in learning the simplest and most fundamental facts the actual personal verification of each fact observed by the student is of vital importance. The third essay follows naturally upon the second and is entitled "The Distribution of Problems." Here are classified and outlined various classes of modern difficulties. Four classes of such difficulties are distinguished: first, the contentions of materialism; secondly, there is the attack on the spiritual nature of man; thirdly, the attack on natural religion or theism—i.e., the general belief in God; and fourthly, the objections directed against Christian dogma or Bible religion. Father Waggett maintains that the doctrine of evolution does not in any sense come into conflict or antagonism with theism, and further states that the supposed antagonism between the theory of natural selection and the idea of God has been in no small measure due to the narrow conception of the latter idea in men's minds. In the next essay, on the Effect of Evolutionary Doctrine, Father Waggett quotes Professor Huxley in support of his contention that theism as such does not come into direct collision at all with the doctrine of evolution stated generally. He goes on to prove that theology is really assisted in its deeper studies by the conception of evolution—to use his words, "By the thought that what we see is not a perfect thing which shows its destined end but a growing thing whose nature is to be guessed by the indications of its purpose and not by the present and evident successes of its labour."

The fifth chapter is devoted to Agnosticism and Determinism, and here Father Waggett deals with two doubts which may arise in many minds—firstly, the suspicion that science alone is real knowledge and that other things which pass under that name are mere fancies, which he regards as agnosticism; and, secondly, that in the realm of science there is an inexorable binding by law, a denial of the idea of freedom which may be referred to as determinism. Father Waggett, with great ability, contends that freedom is not denied by the universality of law, that, indeed, freedom grows when law becomes clear and definite, and only in this way. In the sixth chapter the relation between Natural Selection and Theism is further developed. Father Waggett, while for the purposes of argument allowing the widest latitude to the theory of natural selection, points out that it does not account either for "the origin of life or for the origin of its character and behaviour." Further, he maintains that it does not account for variation and that therefore it does not come into conflict with that reverence for supreme creative power which forms one of the supports of religious conviction. The same idea is developed in the next chapter, under the heading of the Bible and Evolution, and after maintaining that the teaching of Genesis should be compared not with modern biology but with other ancient cosmogonies, Father Waggett claims that the Bible foreshadows some of the most striking and surest elements of modern thought, that it excludes the two extremes of dualism and scepticism, and that it affords a statement of truth in a form credible throughout the ages.

The eighth chapter is devoted to an analysis of the effect of biological doctrines on certain views of human nature. The conclusions of anthropological, physiological, psychological, and embryological studies are critically considered, while the idea of greater freedom in the realm where law is most evolved suggested in a previous essay is further developed. The last two chapters—on Experiment, Dogma, and the Aids which Science gives to the Religious Mind—are practically an application of the previously developed

ideas to the use of religion and within the space of a review they cannot be outlined, especially as the author's matter does not lend itself to condensation. We have enjoyed the perusal of Father Waggett's book and can commend it to those of our readers who desire a thoughtful exposition of modern scientific ideas as applied to the problems of religious thought.

Atmokausis und Zestokausis: die Behandlung mit hochgespanntem Wasserdampf in der Gynäkologie. (*Atmokausis and Zestokausis: the Therapeutic Use of Superheated Steam in Gynæcology.*) By Dr. LUDWIG PINCUS. Second revised edition. With 33 figures and tables. Wiesbaden: J. F. Bergmann. 1906. Pp. 371. Price 6 marks.

THE application of steam to the interior of the uterus as a means of arresting hæmorrhage, although practised by but few persons in this country, is yet in Germany, at any rate, a well-recognised therapeutic measure. This is largely owing to the work and zeal of Dr. Pincus of Danzig, who has done more than anyone else to popularise this mode of treatment. In the second edition of his book the whole subject is very fully dealt with and after reading the evidence afforded by it, it will be impossible for anyone to deny that in certain well-defined conditions atmokausis and zestokausis are perfectly legitimate and useful methods of treatment.

The first part of the work is taken up with an account of the gradual development of the apparatus employed and of the experimental investigations which have been carried out as to the effects produced by the application of superheated steam to the interior of the uterus. The second part deals with the manner in which the application of the steam should be made to the uterus and with the indications for, and the contra-indications to, its use. In his summary of the history of the method Dr. Pincus points out that the use of boiling water in the treatment of fistulæ and sinuses was well known to Rust in the year 1813, but that K. H. Dzondi of Halle was the first to devise a satisfactory boiler for the ready production of steam for this and similar purposes. The disinfectant and hæmostatic properties of this agent were well known to the surgeons of that date, but its systematic employment as a hæmostatic was not really begun until the year 1886, when it was placed upon a definite footing in surgery by Snegirow of Moscow. The rest of this chapter deals in a most interesting manner with the way in which the various difficulties and dangers were overcome by the energy and determination of the author of this work, often, indeed, in the face of much opposition and scepticism on the part of the opponents of this method of treatment.

In order that good results may be obtained with atmokausis the rules laid down for its use by the author cannot be followed too carefully. Sufficient dilatation of the cervical canal must be produced by the use of dilators, or better by the use of a laminaria tent. Before the introduction of the steam into the uterus the cavity and the mucous membrane must be cleansed carefully from all blood and mucus, preferably with a 1 per cent. solution of peroxide of hydrogen. In all cases great care must be taken to determine the exact length of the uterus and of the cervical canal, and, further, that the uterine appendages and cellular tissues are in a perfectly healthy condition. In the majority of cases Dr. Pincus considers anæsthesia unnecessary, laying stress on the fact that if the patient complains of pain during the operation the introduction of the steam should at once be stopped. This mode of treatment can be practised on out-patients and on its first introduction this was considered to be one of its most important advantages, but it is on the whole safer to treat the patients on the same lines as if they had had the uterus curetted, and to keep them in bed as a precautionary measure for the same length of time.

In cases where there is any doubt as to the condition of the uterine appendages, or where these are painful on examination, the patient should be subjected to a course of suitable treatment, and steaming the uterus should only be carried out with the utmost care. One of the chief dangers of the use of so powerful an agent as superheated steam in the interior of the uterus is the fear of causing obliteration of the cervical canal, with a resulting collection of the menstrual blood in the interior of the uterus. This must be carefully guarded against, first of all by observing the rules never to introduce the catheter with the steam turned on, and secondly, never to withdraw it so far as to leave the tissues of the cervix unprotected by the special sheath of non-conducting material intended to shield them from the action of the steam. Great care must be taken also to see that neither the inlet nor the outlet tubes become blocked by blood clot. The best results are obtained by using steam at a temperature of from 110° to 115° C. for as short a time as possible—viz., from five up to 40 seconds. If the steaming is repeated this should not be done until from three to four weeks have elapsed or until after the occurrence of the next menstrual period.

The indications for the use of steam may be divided into absolute and relative. Included amongst the former are such conditions as certain forms of pre-climacteric hæmorrhage; all cases of hæmophilia with hæmorrhage from the uterus; certain forms of hæmorrhage in cases of fibromyomata of the uterus; certain forms of endometritis hæmorrhagica and endometritis hyperplastica in young women and atonic hæmorrhages, especially after abortions or in the later stages of the puerperium; and for the sterilisation of women under certain conditions. As relative indications Dr. Pincus enumerates cases of subinvolution and cases such as membranous dysmenorrhœa in which it may be used as an accessory to the curette. Atmokausis is to be preferred to the curette when the latter instrument has already been employed without success, and especially in patients suffering from excessive anæmia in whom it is important to avoid any further loss of blood. Zestokausis, which is in reality merely a form of actual cautery, is indicated when a cauterisation of some localised portion of the endometrium is necessary, and in the treatment of some cases of so-called endometritis dysmenorrhœica. Atmokausis is undoubtedly a most valuable means of arresting hæmorrhage in certain well-defined cases. When used intelligently and with proper precautions it gives good results in such cases, and it often succeeds where curettage alone fails. Whether it produces a more permanent effect than the somewhat old-fashioned plan of applying pure acids, such as carbolic or nitric acids, to the uterus, after using the curette, is still doubtful; such applications often fail, however, in producing the desired effect, and Dr. Pincus and others have certainly proved that atmokausis when properly carried out is one of the most efficacious methods, if not the most efficacious, of arresting hæmorrhage from the uterus.

Recent Advances in Physiology and Bio-Chemistry. Edited by LEONARD HILL, M.B. Lond., F.R.S. Contributors: Benjamin Moore, M.A., D.Sc.; Leonard Hill, M.B. Lond., F.R.S.; J. J. R. Macleod, M.B. Aberd.; M. S. Pembrey, M.A., M.D. Oxon.; and A. P. Beddard, M.A., M.D. Cantab. London: Edward Arnold. 1906. Price 18s. net.

OUR German *confrères* have accustomed us to *résumés*, Centralblatts, and recently to "Ergebnisse" on various topics. This volume is a welcome departure in a similar direction by five English physiologists who have essayed with success to give a critical *résumé* of certain subjects that have specially attracted the attention of physiologists and of chemists in recent years. Even the word "bio-chemistry," though it does not denote a new departure, foreshadows a new method of regarding the relations of chemistry and

physiology. Dr. Moore, indeed, in his thoughtful essay on living matter goes further than either chemist or physicist and speaks of "biotic energy." The real problem before us is that of the chemical reactions and exchanges that are taking place in the cells—reactions that are really reactions in solution. Recent investigations have shown the enormous part taken by intracellular enzymes acting as energy transformers, and the chapter on the action of enzymes is well worthy of perusal. The intracellular enzymes—and they are many—are shown to be adapted, controlled, and coördinated by the cell. By a gentle transition we arrive at the "kinases," a section of the book that is of very great interest. The whole subject of secretion is fully dealt with. Indeed, what is often spoken of as secretion, absorption, and excretion are but different phases of the same process distinguished from one another not by things intrinsically different in their nature or in the mechanism by which these processes are carried out in the body, but rather by their object or physiological function. Moreover, respiration is essentially identical in its nature with these three processes and Dr. Moore treats the subject from this wide and comprehensive point of view.

Dr. Hill gives a capital account of the effects on life of lessening or increasing the barometric pressure, a subject which he has made specially his own. He also is responsible for the chapter on water in relation to metabolism and the regulation of body temperature, and for a chapter on metabolism of fat. Dr. Macleod deals with metabolism of the carbohydrates, a subject which naturally leads to the cognate question of diabetes, whether experimental, pancreatic, or produced by the administration of phloridzin or adrenalin. Proteid metabolism as such is not specifically dealt with but the questions connected with uric acid and the purin bodies absorb about 50 pages. By the same author we have another 40 pages on hæmolysins and allied bodies, a review of the work of the past few years on this and cognate subjects. Dr. Pembrey gives an account of respiratory exchange on well-known lines and to him falls also the subject of internal secretion. Perhaps this latter chapter might have been extended with advantage. Dr. Beddard deals with rather a heterogeneous group of subjects—namely, the production of lymph, absorption from the small intestine, the formation of urea, and the secretion of urine. As to lymph formation the author agrees that experiments have shown that the importance of osmosis and diffusion is relatively greater, and that of filtration relatively less, than has been thought to be the case. He gives a *résumé* of his views on p. 615.

This work will prove most valuable to all students of medicine reading for the higher examinations. Moreover, to the clinician it affords a *catena* of the views of the chief authorities on such subjects as diabetes, uric acid metabolism, hæmolysis and immunity, caisson sickness, and the therapeutic uses of oxygen, and, indeed, all the newer problems which have such special interest for the thoughtful clinician and practising physician.

Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India. (New Series.) No. 24. *On a Parasite found in the White Corpuscles of the Blood of Palm Squirrels.* By Captain W. S. PATTON, M.B. Edin., I.M.S. Issued under the authority of the Government of India by the Sanitary Commissioner with the Government of India, Simla. Calcutta: Office of the Superintendent of Government Printing, India. 1906 Pp. 14. Price, annas 12, or 1*s.* 2*d.*

SEVERAL hæmogregarinidæ have been discovered recently in the blood of mammals, and in view of the great importance which attaches to such forms the description of another example is of interest, especially as the parasite found by Captain Patton invades a special cell, the large mononuclear leucocyte. The mammal which harbours this parasite is the common, striped, palm squirrel of Kathiawar and Gujarat (Funambulus pennantii). Parasites belonging to the genus hæmogregarina have the following characters: they are elongated, fusiform bodies with the appearance of vermicules, and are seen lying coiled up in the cells or free in the plasma. They do not produce pigment and have no sexual form of development. In cold-blooded animals they are confined entirely to the red cells. Captain Patton discovered this parasite in May, 1905. On examining a drop of blood from an infected squirrel the parasite is seen as a clear elongated worm-like body measuring 10μ in length, lying in the substance of the large mononuclear leucocytes. The majority exhibit slow vermicular movements, altering their position in the cells. They may be seen lying close alongside the nucleus or at right angles to it. The nucleus becomes compressed, and in some instances almost encircles the parasite, while many of the nuclei are split into two separate parts, with the parasite lying between. The invaded leucocytes show extremely slight movements. Each body is oval with one end rounder than the other. The protoplasm contains a large refractile nucleus placed about the centre and some dark dots are seen moving in the protoplasm. The narrow end shows a distinct bend upwards simulating a tail. In fresh blood films containing a large number of parasites some of these bodies are seen escaping from the cells. After watching one, which appears particularly active, the more rounded end will be seen to cause the cellular envelope to bulge. It ruptures and the parasite is extruded. No space is left behind to show where the parasite was lying. Besides the encysted forms many are seen lying free in the plasma. They have the same appearance as those in the cells. The parasite stains readily with Romanowsky's stain and Leishman's modification. No distinct capsule can be made out by staining in the usual way, but by prolonged staining with Romanowsky's stain and also with Giemsa's a faint pink outline is seen around the parasite. Each stained body is oval in shape with one extremity larger and rounder than the other. It measures 10μ in length and 5μ across the broadest part. The protoplasm stains light-blue, somewhat darker at the two ends. The nucleus is a comparatively large irregularly quadrilateral mass, which lies about the centre. It occupies the whole of this part of the parasite, encroaching on the sides. It stains deeply but not uniformly, and contains from three to eight vacuoles. The protoplasm of all the invaded leucocytes stains feebly as compared with the normal cell.

In infected squirrels the large mononuclears form the bulk of the white cells; the mononuclear leucocytosis is found to vary in proportion to the degree of infection. The fact that a mammalian protozoon, which has the property of invading a special leucocyte, causes a change in the structure and an increase in the numbers of these in the peripheral blood may have some significance in relation to the origin of leucocythæmias. The parasites were always found to be present in the spleen. Special attention was directed to the liver in estimating the distribution of the parasite in the body. 14 squirrels were shot and smears were made from their livers. In all the parasite was found both free and in the mononuclear leucocytes, but no developmental forms were present. The parasite has been found in the body of the squirrel louse, which has been identified by Professor Neumann and Dr. Newstead as an undescribed species of hæmatopinus and is found in large numbers among the long hairs of the squirrel. Captain Patton draws the following conclusions from his researches. That the description of this parasite agrees in every detail with that of a hæmogregarine. That the parasite is highly specialised in that it selects the large mononuclear leucocyte for its host. Though closely related

to leucocytozoön canis (James) it differs in not having a cytocyst and in possessing a tail. He proposes to name it provisionally leucocytozoön funambuli. As in the case of hæmogregarina gerbilli (Christophers) no developmental forms were found in the organs and the infection remains unaltered for long periods.

LIBRARY TABLE.

The Edinburgh Stereoscopic Atlas of Anatomy. Edited by DAVID WATERSTON, M.A., M.D. Edin., F.R.C.S. Edin., F.R.S. Edin., Lecturer and Senior Demonstrator in the Department of Anatomy, University of Edinburgh. Section 5. Edinburgh: T. C. and E. C. Jack. 1906. Price £1 5s. net each section.—This being the fifth is the final section of the Atlas and Dr. Waterston is to be congratulated on the completion of his task. The last instalment is equal in interest to any of its predecessors. It is devoted to illustrations of the anatomy of the head and neck and the central nervous system, and to cranio-cerebral topography. The anatomy of the brain was in part depicted in the first part of the Atlas, but in the present section we find an additional series of ten illustrations which are excellent. We gather that these are views of specimens prepared by Dr. E. B. Jamieson who is also responsible for the brief descriptions which accompany them. We think that Dr. Waterston has been fortunate in obtaining Dr. Jamieson's coöperation, for the views in question are of great practical utility and give an excellent idea of some of the long tracts of the brain. The anatomy of the head and neck is fully illustrated, the nasal cavities, pharynx, and larynx being included. Ten views illustrate cranio-cerebral topography. These comprise illustrations of the child's brain and of that of the adult. By a method of composite photography the relations of the scalp, bones, and brain are shown in superposition. The value of these photographs is in a way limited, since everything is mapped out according to the method of Professor Chiene, a method which is not so well known as those methods which are associated with the names of Reid, Hare, Godlee or Anderson and Makins. In a note appended to the section Dr. Waterston dedicates the Atlas, with permission, to Principal Sir William Turner, K.C.B., whose researches and teaching have done so much to advance the science of anatomy both in this country and abroad.

Cheltenham. Burrow's Royal Series of Official Albums. No. 7. Written by J. H. GARRETT, M.D. Durh., Medical Officer of Health of Cheltenham. With 120 coloured and other illustrations. Published under the auspices of the Corporation and the Chamber of Commerce, Cheltenham, by Edward J. Burrow. Fifth edition. 1906. Pp. 163. Price 1s.—This official guide to Cheltenham was published under the auspices of both the Corporation and the Chamber of Commerce on the occasion of the opening of the new spa. The old fashion of drinking the Cheltenham waters, which was set by Royalty in the person of George III., subsided chiefly owing to the ease of foreign travel, but the use of the waters is now being revived. The wells are chiefly owned by the corporation, which body collects the waters and offers them in convenient forms, at several different places in the town, for the use of those who may desire them or who have been ordered to take them by a physician. The waters are mildly aperient, alterative, diuretic, and antacid and are of two kinds—the magnesia-saline and the alkaline-saline waters. The magnesia-saline is sold in a concentrated form, so that a moderate draught may have an aperient effect. Some excellent baths have been built by the corporation for use in conjunction with the mineral waters and it is stated in the album that any form of medicated or special bath that the physician chooses to order can be prepared and administered by trained attendants. The brine bath is a Cheltenham specialty. The fittings and decorations of the baths and the furnishing of the dressing-rooms appear to be of the first order. The Cheltenham spa should be deservedly popular, for the town compares favourably with other large towns in its general sanitary condition, and its climate possesses the two very essential features of a dry atmosphere and an abundance of bright sunshine. This album is a useful guide, the letterpress being interesting and the illustrations good. Its cost is only 1s.

Studies in Anatomy from the Anatomical Department of the University of Manchester. Vol. III. Edited by ALFRED H. YOUNG, M.B. Edin., F.R.C.S. Eng., Professor of Anatomy. Manchester: At the University Press. 1906. Pp. 289. Price 10s. net.—This forms the third volume of the Studies in Anatomy issued by the Council of the Owens College and contains contributions of considerable interest. There are ten papers included, but six of these are reprints from the *Journal of Anatomy and Physiology*. The new contributions are four in number. A paper by Professor A. H. Young and Dr. W. Milligan shows the anatomical and developmental continuity of the Eustachian tube, tympanum, and mastoid antrum. Attention is drawn to the very early development of mastoid air cells and some observations are appended on the treatment of septic inflammation of the tympanic cavity. Dr. J. Dunlop Lickley discusses the Morphology and Development of the Human Sternum. This paper is a summary of a larger monograph which was presented as a thesis for the M.D. degree of the University of Glasgow. The paper is critical and instructive and questions some of the recent deductions of Professor A. M. Paterson and others. A copious bibliography is appended. Dr. J. Cameron contributes a paper on the Development of the Optic Nerve in Amphibians, in which he shows that the nerve fibres are formed by a combination of the central and peripheral modes of origin. The paper is welcome considering the discussions which have lately arisen in connexion with the development of peripheral nerves. An investigation by Dr. C. W. S. Saberton on the constitution of the nerve plexuses of Troglodytes Niger embodies the results of a very laborious research. The reprints in the volume are papers by Professor Arthur Robinson on the Formation of the Pericardium; Professor Peter Thompson on the Fasciæ of the Pelvis; Professor Young and Professor Thompson on Abnormalities of the Renal Arteries; Dr. F. C. Moore on the Unsymmetrical Kidney; Dr. Lickley on the Morphology of the Human Intertransverse Muscles; and Professor Young on the Lumbar Arteries. Most of these contributions are already well known to English anatomists. The volume is well printed and bound. It speaks well for the activity of investigation at Manchester.

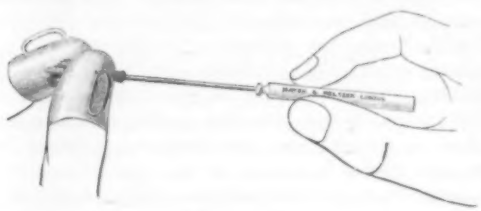
Minor and Operative Surgery, including Bandaging. By HENRY R. WHARTON, M.D., Professor of Clinical Surgery in the Woman's Medical College of Pennsylvania. Sixth edition, enlarged and thoroughly revised. With 532 illustrations. London: Rebman, Limited. 1905. Pp. 650. Price 14s. net.—The author of this work hopes that the broadened scope of its new edition will render the volume more serviceable to the student and to the practitioner. The favour bestowed on former editions has, the author says, acted on him as an incentive for keeping the book thoroughly revised and up to date. The whole volume is most liberally treated from the pictorial standpoint and the subject matter is thoroughly well arranged and explained. In successive editions the author has been led to add operations which are somewhat beyond the vague line separating major from minor surgery. Thus the book has been broadened beyond its original title

in response to the expressed wishes of its readers. The great attention now paid in medical schools to operations on the cadaver and the importance of this method of instruction have led the author to include those procedures which can be advantageously practised upon the dead body, such as ligation of the vessels, amputations, excisions, operations upon nerves and tendons, and intestinal anastomosis. A number of operations which are frequently required in practice are also included, such as tracheotomy, intubation of the larynx, and the operations for appendicitis and for strangulated hernia. While this edition is therefore a comprehensive manual, covering all but what may be termed Capital Surgery, yet all the features which have met with favour in former editions are retained, including a concise description of the various bandages, surgical dressings, and minor surgical procedures employed at the present day. The art of bandaging is fully illustrated with reproductions of photographs, and a special chapter is devoted to surgical bacteriology. The subject of fractures and dislocations is photographically illustrated. The chapter on the preparation of materials used in aseptic operations and on the details of an aseptic operation is an excellent one and contains much valuable information. The directions in the section on intubation of the larynx are very clear; the author emphasises the necessity of hugging the posterior surface of the tongue closely. This edition will no doubt be as popular as the former issues have been. It is a good book.

New Inventions.

THIMBLES FOR MAKING WOOL MOPS.

THE drawback of making surgical mops by holding the cotton wool between the finger and thumb is that in order to make them clean repeated washing of the fingers is necessary and even when this is done absolute cleanliness is doubtful. To avoid these inconveniences I have had the metal thimbles shown in the accompanying figure made for



the left forefinger and thumb. They are flattened and provided with several shallow and one deeper groove on the opposing surfaces, where also the metal is dulled instead of being polished. With a little practice mops of any size can be rapidly made. The thimbles, which fit on to a little metal stand, can be boiled, stand and all, before use and if they are only kept on whilst actually making the mops they can be employed for a series of cases without any further cleaning. The handles are merely for lifting them off the stand. They have been made for ear, nose, and throat work but can, of course, be used to make mops for other purposes. I have found them more convenient than Kayser's forceps, which were devised with the same object. The thimbles are made by Messrs. Mayer and Meltzer, 71, Great Portland-street, W., in various sizes.

Brook-street, W. E. CRESSWELL BABER, M.B. Lond.

A COMBINED VAGINAL DOUCHE AND STERILISER.

THE difficulty so often experienced by midwives in obtaining hot water in cases of emergency is obviated by this appliance. As it is provided with a lamp and is supported on a firm stand the midwife will always have the means of warming water so that a hot douche can be obtained in a few minutes. Again, in case the surgeon's aid is called in she can provide him with a steriliser for his instruments as

it is large enough to hold forceps, &c., for sterilising purposes. Without the stand and lamp it forms an ordinary douche can. It is made of a convenient size and will easily go in the midwife's bag. It has been made for me by the Medical Supply Association, 228–230, Gray's Inn-road, London, W.C.

CLAUDE ST. AUBYN-FARRER, L.R.C.P. & S. Edin., L.F.P.S. Glasg.,
Physician-Accoucheur, Royal Maternity Charity.
Westbourne Park-road, W.

A NEW POST-NASAL SYRINGE.

THE advantages of post-nasal syringing over the more usual methods of flushing out the nasal passages are obvious. The only objection thereto consists in the somewhat greater difficulty of the proceeding. In order to facilitate this I have devised a modified post-nasal syringe which I find can be used by most people themselves with at least as much ease as the ordinary enema syringe, though, of course, there are some exceptions. The general appearance of it is shown in the illustration. The straight part of the

metal nozzle is about five inches long and the extremity is turned up for a length of about three-quarters of an inch. The orifice is in the form of a deep, narrow slit, which delivers a flat jet of fluid when the indiarubber ball is compressed. The instrument is made by Messrs. C. J. Hewlett and Son, Charlotte-street, London, E.C.

Argyll-road, W. F. H. BURTON-BROWN, M.D. Oxon.

THE LANCET.

LONDON: SATURDAY, AUGUST 18, 1906.

Infantile Mortality.

WE publish this week three important articles bearing directly or indirectly upon the great question of the control of infantile mortality, articles which were read at the National Conference on that subject held on June 13th and 14th under the chairmanship of the President of the Local Government Board. Mr. JOHN BURNS showed himself to be fully conscious of the magnitude of the questions to be discussed, but the pressure of public affairs and of intelligence of other kinds served greatly to divert public attention from the proceedings of the Conference. It is not, however, too late to return to a subject of the first national importance, and the three contributions which we now place before our readers will afford excellent material for reflection not only to medical men but to all thinking people. Of the three articles that by Dr. GEORGE REID, medical officer of health of Staffordshire, throws the largest amount of light upon the actual causation of mortality, while the articles on milk-supply by Dr. A. K. CHALMERS and Dr. G. F. MCCLEARY indicate the directions in which remedies for the absence of breast-feeding may most hopefully be sought. Dr. REID informs us that his attention was early directed towards the high infantile mortality of north as compared with south Staffordshire, the inhabitants of the former division being chiefly potters, whose women are largely engaged in factories, and those of the latter chiefly miners and iron-workers, whose women remain at home. A comparison between the two, carefully carried out over a series of years, entirely justifies the conclusion that maternal factory work is the chief and most widely operative cause of a high infantile death-rate. The figures given are conclusive. The percentage of female married and widowed factory workers to the whole female population between the ages of 15 and 50 years was taken from different localities. In five towns, in which this percentage was 12 or more, the infantile mortality was 193. In 13 towns in which the percentage was under 12 and over 6 the infantile mortality was 156; and in eight towns in which the percentage was under 6 the infantile mortality was 149. The lowest rate leaves much to be desired, but the difference between the highest and the lowest is far too great to be accidental. It appears, moreover, that the preponderant mortality of the children of female factory workers is at least partly due to defective viability induced by work during pregnancy, and on this part of the question the operation of the Midwives Act has already furnished important statistics. Up to the present time the midwives in the northern district have returned 9·4 per cent. of still-births and 15 per cent. of abnormalities in labour, against 3·2 per cent. of still-births and 6 per cent. of abnormalities in the southern. Dr. GEORGE NEWMAN, in his recent work on Infantile Mortality which we reviewed in our columns recently,[1] quotes Dr. REID'S figures, and declares that they are perhaps less emphatic than would be those of similar tables for Lancashire, where there are "seven times more married women employed than in Staffordshire."

If we leave out of consideration the manifestly considerable proportion of infants who come into the world handicapped by the operation of unfavourable maternal conditions during pregnancy, infants, that is, whose mothers suffer from long standing, exhausting labour, or unsuitable or insufficient food, we shall obviously find a chief cause of mortality, even among infants born healthy, in the deprivation of breast-milk, which is incidental to the absence of the mother at the factory, as well as in the ordinary character of the substitutes which are employed. Dr. CHALMERS and Dr. MCCLEARY show us how much might be done, if local sanitary authorities were acquainted with the nature of their duties and were desirous of fulfilling them, to improve the management of dairy farms and the quality of urban milk supplies; but, even if nothing were left to be desired in these respects, there would still be an active production of infantile mortality by the sheer ignorance of mothers. Sir WILLIAM BROADBENT recently characterised the indiarubber teat as "an invention of the devil," and it is by no means the only popular appliance which might be so described. The mothers among the industrial classes, as a rule, know nothing about the primary conditions of health for infants, and are guided by traditions handed down from bygone ages. A medical writer has placed on record that his instructions about the management of a sick child were departed from on the advice of a neighbour whose claims to be accepted as an authority were based upon the fact that she had "lost nine children of her own," and the experience of this writer is one that might have been anticipated. Similar things happen daily. Parents of the working classes constantly say of their baby, "We give it what we have ourselves," this including not only forms of food wholly unsuited to the infantile digestive organs, but not seldom "a sup of beer." To medical practitioners, conversant with the habits and dwellings of large classes of the poor, it is less wonderful that children die than that they survive, more especially when, as often happens, the discomfort produced by improper feeding is relieved by the administration of a narcotic. Professor RAY LANKESTER, in his recent address as President of the British Association for the Advancement of Science, dwelt with much force upon the truth that the political administrators of this country, as well as the permanent officials, are altogether unaware of the importance of the knowledge which we call science, and of the urgent need for making use of it in a variety of public affairs. He traces the defect, quite correctly, to the "defective education, both at school and university, of our governing class," but he fails to call attention to the fact that the education of the middle-class, which supplies the bulk of our "local authorities," is at least equally defective, and that the business committed to them is as badly done as that of the nation. We have had a third of a century of compulsory so-called "education" of

[1] THE LANCET, July 28th, 1906, p. 230.

the working classes, and the most obvious outcome of it has been to render them the prey of designing advertisers. The girls of the present day know no more than their great-grandmothers about the cooking of wholesome meals or about the nurture and feeding of infants, and that this should be so is a grave reflection upon the community.

The framers of the Education Act of 1870 may, perhaps, be asumed to have had no distinct consciousness of the full meaning of the principle which was established by their legislation. That principle is, we take it, that the State asserts a degree of proprietorship in the children born within its boundaries, and hence becomes charged with responsibilities to them which it is very difficult either to limit or to define. It compels the children to undergo, at the cost of the public, a process which is described as education. It becomes responsible to the children for securing, firstly, that this process shall not be actively injurious to them, and secondly, that it shall be as useful as circumstances will permit. It becomes responsible to the public for the proper use of the public money, and is bound to see that this is not wholly wasted or thrown away. The precautions necessary for the attainment of these ends are chiefly such as were formerly supposed to devolve primarily upon parents; and hence, in whatever degree they are accepted by the State, it becomes necessary for the State to control or to supersede parental management. It is clearly injurious to an underfed child to be compelled to exert his brain about tasks; and hence, if the tasks are to be enforced, the State must see that the parent feeds the child properly, or must itself supply the deficiencies in this respect. Sufficiency of food bears a definite ratio to sufficiency of clothing, and this also may come within the province of the State. An infant below school age is nevertheless, if not an actual, at least a prospective, source of public expenditure, and hence the State becomes concerned to see that his earliest years are so passed that he may not be a useless investment for public money when school age is reached. It follows from compulsory education that the past liberty of parents to deal as they pleased with their children must in many respects be limited or curtailed in the public interest, and the sooner this is generally realised the sooner shall we get down to some bed-rock of principle with regard to the care and treatment of those who are to form the backbone of coming generations. Is it not time that our law makers took some thought for the descendants of our race? "Labour" Members are becoming conspicuous in Parliament, and are likely to strive after legislation by which they will hope to benefit their class. At present there is no indication that their efforts will be guided by adequate knowledge, and there is great need for the aid of science to be invoked. Infantile mortality on the one hand and a dirty and adulterated milk-supply on the other are mere symptoms of derangement in the body politic, but they are symptoms likely to be far-reaching in their consequences. The Education Board and the Local Government Board must have scientific guidance. Effectual reforms can only be attained under such guidance, and knowledge of the means by which physical health and efficiency can be secured falls strictly within the sphere of the medical profession. This knowledge is ready to come to the aid of legislation, and surely the time has arrived when legislators should be ready to appreciate the assistance offered.

Human Diet and Human Efficiency.

No catchword has been more mouthed of recent years than efficiency. Books in praise of efficiency or giving instruction in efficiency abound—we reviewed one such volume last week and gave it due praise; the efficiency of public bodies of all kinds, of the army and the navy, the War Office and the Admiralty, the House of Lords and the House of Commons, has been questioned and discussed till the very word efficiency has become almost a burden to the ear. Now, if individuals are not efficient no corporate body is likely to be so in the nation which these individuals compose, while grave difficulties face statesman and sanitarian alike when an attempt is made to decide what are the best methods for obtaining efficiency. Broadly looked at, all national schemes of education, whether for general purposes or for such special aims as those of the public services, are steps along the road to efficiency, but they are not the commencement of that road, and the beginnings of the real road are too often neglected. Efficiency looked at from the frankly medical point of view resolves itself into the health of the individual. The healthy mind in the healthy body (a phrase as over-used as is the word efficiency) none the less contains the truth, and those who are most urgent that our public work should be thorough must, if they are logical, show themselves most anxious about our public and our individual health. Some of the most important subjects upon which the proper healthy development of man and woman depends are barely touched upon in the educational schemes of to-day, whether we look upon the education of the masses or whether we regard the more fortunate thousands who grow up either in the great public schools for boys or in the corresponding institutions for girls. The strides that science has made in the last half century have not been paralleled by the art of education. The latter has been content to loll behind, noticing perhaps with admiring gaze the progress of her sister but hardly dreaming of any emulation of her activity. Is there, then, no science of living, no art of the conduct of life, that teachers may instil into the minds of their pupils? Most assuredly there is, and it is the most important of all arts and sciences. Yet to find its pursuit as a national ideal the imagination must almost return to the days of ancient Greece. We do not belong to the ranks of those who croak and cry "national decay." We believe that, despite the undoubtedly evil influence of large towns, national decadence is not upon us. The robust inheritance of British ancestry is far from worn out, but we are ardent supporters of those who wish to see no step untrodden that can lead to the finest results from the activities of our national character. Somehow, as has been said, we as a nation "muddle through and come out successfully." Who would not like to see the muddling exchanged for the strong and direct action of a nation that had studied and that was practising the science of life?

This science of life, as we comprehend it and as we would

have it taught to children, has two main directions. The first leads to spiritual development and the second to the perfection of bodily health and purity. The latter is well expressed in the sacred writings of the East where bodily happiness is described as "lightness, healthiness, peace, a good complexion, beauty and grace, perfect fragrance, a melodious voice, and light excretions." To what degree is any bodily ideal of this sort put before English children? It is true that swimming-baths and open-air games are well patronised, instincts of cleanliness and a wholesome liking for bodily exercise being thus encouraged, but children should also be taught the beauty of personal hygiene, and the part which it plays in the greatness of a nation. They should be led thus from its personal to its corporate and its national application. We are not so sanguine as to believe that the evils of overcrowding and of town living generally would di appear before the clear ideas and the clean desires of a manhood and womanhood thus instructed, but undoubtedly national physique would be in less danger of degenerating at the hands of men and women who had grown up with a knowledge and understanding of proper bodily development. Our readers know so well how largely growth and development depend upon nutrition that they may, some of them, fail to realise how densely ignorant of such matters the mass of the population is. The matter is one upon which instruction might most profitably be given as part of a scheme of national education. What does the child or the young man or woman of to-day know about the nutritional values of the different kinds of food? Not one out of any ten average men or women has any simple rational principles or knowledge to serve as guide in the choice of food. This is shown by the violent faddishness and extravagant credulity of those who do make attempts to regulate their diets every whit as much as by the horrible errors of dietary so familiar to the general practitioner, and now and again made public during the proceedings at a coroner's inquest. The lower animals are more fortunate in respect of their diet than is the majority of human beings, for in the wild state the young animals are carefully guided and instructed as to their prey. They are shown what to eat and how to get it. Science and experiment have recently shed much light on the food problems that affect human beings. They have brought to light new facts as to how much food the healthy organism requires and as to what should be the nature of that food. Knowledge of this kind is of the greatest value in its relation to the economy and the health of a nation's population. Yet the dissemination of such knowledge in simple terms amongst those of an age when the habits of life are most easily and most surely formed is at present almost entirely absent.

We have been moved to some of these reflections by the perusal of a book entitled "Humaniculture,"[1] written by Mr. HUBERT HIGGINS, an English medical man practising in Italy, whose paper in our columns last year, entitled "Is Man Poltophagic or Psomophagic?" attracted considerable attention. Those of our readers who are familiar with the work of Professor CHITTENDEN and Dr. ROBERT HUTCHISON will have no difficulty in realising the new knowledge now at our disposal in the matter of diet, nor need we on their account lay stress upon the far-reaching effects of correct behaviour in this respect. To others desiring a simpler gospel, one that can be handed on almost without translation or exegesis to their patients, we commend "Humaniculture." Mr. HIGGINS is a worker upon the lines of Mr. HORACE FLETCHER, whose ideas and experiments in the matter of food and feeding we have previously commented on, and whose work has received the official recognition of the International Congress of Physiology. We are not prepared to support all the theories advanced either by Mr. FLETCHER or by Mr. HIGGINS, but we recommend without hesitation much of the practice which they advocate. The old and salutary advice to eat little and to take a long time over it is the gist of their message. What is new, however, in Mr. HIGGINS's book is the careful clinical experiments upon which the assertions rest, and the alteration of the proteid standard which their acceptance involves. As is well known, Mr. FLETCHER has succeeded in arousing enlightened enthusiasm not only in' his own country of America but also in the University of Cambridge, where Sir MICHAEL FOSTER superintended the work undertaken to test his views. It may seem to many that the simple practice of eating sparely and eating slowly has little to do with national questions or even with individual and moral advantage. Even when dignified by the name of "poltophagy" chewing does not seem a matter of wide significance. Yet who is to draw the line where physical and psychical influences cease to take effect upon each other? Goutiness and a quick temper, dyspepsia and melancholy, are merely gross instances of the interaction of mind and matter, and there is no doubt that there are many associations between the two that can at present be only guessed at. Without attributing too much to the influence of food, we may safely assume that the nation which boasts the most rationally fed individuals will, in the long run, have the best chance in international struggles. We cordially welcome any attempts to educate our population, either through or independently of the medical profession, in the principles of healthful diet.

[1] Published by Frederick A. Stokes Company, New York. Pp. 355, 8vo, price $2.

Employment for Working-class Consumptives.

THE after-care and the possibilities of occupation for the consumptive patient of the operative classes together constitute a sociological and economic problem of considerable importance and of very great difficulty. A carefully thought-out and highly suggestive contribution to the discussion of this problem by Dr. M. S. PATERSON and Dr. F. C. SHRUBSALL was published in THE LANCET of July 28th, p. 217, and is worth very careful consideration by all who may have to give advice to such patients. It must be admitted at the outset, as the authors claim, that the advice is often given to such patients to change their occupation and to obtain "open-air" employment without due consideration of the difficulties liable to be encountered in effecting such a change. In other words, the advice, though eminently sound in theory, is impracticable.

Dr. PATERSON and Dr. SHRUBSALL point out very forcibly how absolutely hopeless may be the outlook of an unskilled labourer, or even a man with an indoor trade or occupation, when he endeavours to obtain outdoor employment of which he has no skilled knowledge; and as they very pithily remark, "there is a certain tendency to forget that starvation is a more serious trouble than tuberculosis." The conclusion arrived at, after a very careful discussion of the possibilities usually suggested to the patient with arrested tuberculosis, is that so far as possible he should return to his own trade, while those without a trade should be largely governed in their choice of an occupation by their wage-earning capacity thereat. The authors further refer to the statistics of German sanatoriums, which seem to prove that cases discharged as quiescent or arrested are capable of returning to their former occupations for periods of three, four, or more years.

With regard to some occupations, the ordinary conditions of work being not unfavourable, the advice to return to their former duties is obviously sound; this applies with especial force, as Dr. PATERSON and Dr. SHRUBSALL urge, to vanmen, tram and omnibus drivers, and most classes of railway servants. It is, however, in the case of those whose work has to be carried out under less favourable conditions that the problem is so difficult, as, for example, those working in factories, workshops, offices, and warehouses. The alternatives usually suggested to patients in such circumstances, after arrest or improvement of the disease, are carefully and fully criticised by the authors. Considering first the suggestion that the patient should obtain some open-air occupation, preferably in the country, they point out that they are then likely to swell the already crowded ranks of unskilled labour for which they are not well fitted, and thus to earn less than they did at their former occupation; hence they are liable to sink into conditions unfavourable to their future progress. The second alternative often put before them is that of emigration; here, again, it should be remembered that unless the person emigrating has some skilled occupation or some special employment guaranteed he is likely to drift into unsuitable places or to fall upon hard times. The third alternative, that of going to sea in some capacity, whether as steward or purser's assistant, is one which is hardly likely to be recommended by anyone knowing the conditions under which they may have to live, so graphically outlined by Dr. PATERSON and Dr. SHRUBSALL in their paper. Dr. PATERSON'S and Dr. SHRUBSALL'S contentions are reinforced in two letters which we publish in THE LANCET of August 11th. One of the writers, Dr. W. G. KINTON, the resident medical officer, Mount Vernon Hospital for Consumption and Diseases of the Chest, rightly remarks that energy might well be expended in concentrating attention on the conditions under which patients have to return to work, instead of regarding only the nature of the work itself. He also lays stress on the importance in enlightening the general public on the general laws of hygiene, so that patients may find help on all sides in continuing the correct mode of life necessary to them. This is a point upon which we have frequently insisted. Mr. T. H. A. VALINTINE writes with especial reference to the matter of emigration, and points to the necessity of great caution being observed by medical men or by friends before discharged patients are recommended to emigrate. Unless they are sure of immediately finding suitable employment on arriving in a new country they may simply starve, or be compelled to face hardships that will interfere with their convalescence.

If we turn to consider the outlook of such patients as return to their former occupations after treatment at a sanatorium or a special hospital, we find that the education as to the advantages of fresh air, ventilation, suitable diet, and self management, which they have received, should enable them to work under better conditions, and even to instruct those among whom they work. Again, their productive or wage-earning capacity is likely to be greater than at a new occupation assumed without special knowledge and against competition, and this is a point very strongly insisted upon by the authors in their paper and one which has influenced them strongly in arriving at their conclusions. We can in most respects cordially endorse the recommendations given by Dr. PATERSON and Dr. SHRUBSALL. It is a familiar fact in out-patient practice at both general hospitals and special institutions for diseases of the chest that patients with chronic tuberculous disease of the lungs go about their work for years, and support themselves and often their families without undue strain, and, so far as can be seen, without markedly prejudicial effect upon the course of their disease. At the same time it must be admitted that in many cases it is practically impossible for the patients to resume their former work—e.g., men invalided from the navy or army, and those whose occupation entails work in hot or moist air, such as laundry work, must find a new outlet for their energies; while in the case of domestic servants, especially those having care of children, fear of infection will preclude their resumption of their duties. It is in such cases that it is extremely difficult to give useful and practical advice, and we cordially echo Dr. PATERSON'S and Dr. SHRUBSALL'S hope that their admirable paper may "at least draw attention to the subject and so help the unfortunate consumptive to be advised thoughtfully as to his future."

Annotations.

"Ne quid nimis."

THE VENTILATION OF THE HOUSE OF COMMONS.

IN a report recently published the last word has been said, even in the light of bacteriological science, as to the defects of the air-supply of the House of Commons. The recommendations contained in this report have already been foreshadowed in an annotation in THE LANCET of April 1st, 1905, in which a report on the quality of the air in the House by Dr. M. H. Gordon was discussed. A Select Committee, which was appointed under the presidency of Sir Michael Foster, has come to the conclusion that on the whole there was little to be said against the quality of the air-supply, but at the same time it acknowledged that this conclusion was opposed to the common experience of many Members of the House, whose opinion it was that the air lacked freshness, that there was missing in it the important element of vitality. It is probable that the whole question is after all one of suitable temperature and humidity, and we understand that

further observations are to be made on these important points. We very much doubt if either the chemistry or the bacteriology of the air of the House of Commons has anything to do with the depressing effects complained of, or with the prevalence of influenza amongst the Members at a time when that disease was epidemic. We still hold to the belief that the physics of the air-supply of the House is wrong, and we are confident that when the temperature and humidity of the air are controlled in accordance with healthy requirement little more will be heard of the unhealthiness of the atmosphere in the legislative chamber. Meanwhile it is interesting to note that the evils arising from dust promise to be mitigated by the use of a vacuum cleaner, and already some half hundredweight or so of dust has been removed weekly from the floor and precincts of the House.

THE GERMAN LANGUAGE AND MEDICAL MEN.

THE British Association for the Advancement of Science at its recent meeting considered the question that was brought forward by Mr. J. G. Robertson of the position of German in the educational curriculum. The proportion of medical men in this country who are able to read German books is very small, yet the number of German books worth reading is very large. The amount of knowledge of the language necessary for profitable perusal of technical books is so comparatively slight that it is a great pity that the necessary trouble is not more often incurred to acquire this knowledge. To any man who has mastered German enough to enjoy its general literature there is open an enormous field of philosophy, poetry, and romance, different from, yet almost the equal of, our own inheritance in this respect. Even without attaining to this point, however, medical men can derive great profit by the smaller knowledge sufficient for technical works. In many branches of science at the present day the German contributions are perhaps the most important of any, and in all branches of medicine they are, at any rate, very far from being deserving of neglect. Mr. Robertson dilated upon the unhappy decline of German as a school subject in England in recent years. Presumably it is secondary to this ill-merited neglect in schools and in universities that there is in our own profession so comparatively small an appreciation given to the wealth of good material provided by German scientific writers for anyone who is to a sufficient extent master of the tongue. German is undoubtedly a difficult language. Enough German, however, to read with profit technical books is not beyond easy acquisition, given moderate perseverance.

THE ANALYSIS OF THE WATER FROM THE HOLY WELL OF ZEM ZEM.

ACCORDING to an analysis which we have made of a sample of water taken recently from the holy well of Zem Zem the sanitary condition of this precious fluid has made little advance during the past quarter of a century. The present makes the fourth opportunity we have had of making such an analysis, the results of previous examinations having been recorded in THE LANCET of Jan. 5th, 1884, p. 33; May 14th, 1892, p. 1075; and Jan. 31st, 1903, p. 327, respectively. The recent specimen examined was forwarded to us by Dr. Frank G. Clemow of Constantinople, British Delegate to the Ottoman Board of Health. The sample was contained in a hermetically sealed tin flask. When undisturbed the water was quite bright, but it contained a sediment of a rusty colour and examination proved this deposit to consist largely of hydrated oxide of iron. There was a distinct pressure in the flask and on opening it a perceptible quantity of gas escaped, which was probably nitrogen. There can be little doubt that the metal container had acted upon the nitrates and reduced them to nitrites and eventually ammonia, in the same way as would the metals copper and zinc when in contact with each other, constituting a galvanic couple. As will be seen from the analyses below, the water contains a comparatively immense quantity of free ammonia. It matters little, however, in what form the nitrogen exists, whether, that is to say, in the form of ammonia, nitrites or nitrates, its only source, as a rule, must have been at some time or other organic matter. That there are manifold opportunities for organic matter to gain access to the well is made very clear from the accounts of many travellers who have witnessed the sacrifices of beasts which are annually held in the neighbourhood of the well. It is probable that the infiltrations of countless carcasses reach the well sooner or later. Moreover, it is part of the ritual that in addition to drinking the water the pilgrim has the fluid poured over him; this water trickles away from his person back to the well, and he is doubly grateful when he discovers on retiring that the cloth round his loins is wet. What wonder then that the water presents on chemical analysis abundant evidences of impurities, and is found to contain phosphates and nitrogenous matters both in the oxidised and unoxidised state. There are, no doubt, active self-purifying processes at work, but that their intensity is not sufficient to cope with the large amount of pollution taking place is plainly apparent from analysis. It is interesting, however, to observe from the following analyses, made at intervals of several years, the variations which take place in regard to the individual items on which the sanitary or insanitary character of a water is broadly based:—

—	1883.	1892.	1902.	1906.
Total solids	464·4	235·2	350·0	200·2
Chlorine	75·5	40·7	72·1	49·7
Nitrogen in nitrates and nitrites ...	13·8	4·4	14·0	0·23
Free ammonia	0·35	0·14	0·14	0·32
Albuminoid ammonia	*Nil.*	*Nil.*	0·02	Trace.

The results are expressed in grains per gallon. The chief variation is in regard to the nitrogen in the form of nitrite and nitrate, the amount of this depending upon the original pollution and the extent to which the nitrogenous matters are oxidised by natural agencies. In the last sample examined nitrites predominated, and the water rapidly decolourised an acidified solution of potassium permanganate. The residue on evaporation gave off a sickening odour on heating and the mass blackened considerably. A very distinct reaction for phosphates was obtained. To say that the water is tainted would be a mere euphemism; it is grossly polluted. Some idea of the extent of this pollution may be gained from the fact that the water of the holy well of Zem Zem contains about 90 times more free ammonia than does the ordinary London drinking water-supply.

THE THERAPEUTIC APPLICATION OF SUGGESTION.

Dr. Mathieu, in a paper read before the Société Thérapeutique de Paris and published in the *Journal de Pharmacie et de Chimie* of July 16th, has recorded the results of his experience in employing suggestion as an aid to therapeutic treatment in the Andral Hospital. In cases of nervous dyspepsia he has obtained great success not by having recourse to pure mental suggestion but by the time-honoured method of administering various harmless substances as vehicles of suggestion (*véhicules de la suggestion*). In nervous cases where a sedative was required he has prescribed dandelion under the name of extract of taraxacum dens leonis, assuring patients suffering from sialorrhœa that it was

an extremely powerful drug. Equally good results were obtained by prescribing applications of collodion, coloured with methylene blue, for pains in the dyspepsia of neurotic patients. Dr. Mathieu has found that insomnia can be successfully treated with chloroform water in teaspoonful doses or by one-gramme doses of sodium phosphate. The latter has given such good results as a soporific that Dr. Mathieu raises the question whether it may not exert a sedative action apart from suggestive influence. He has given injections of a simple physiological salt solution, labeled "Morphine B," and has observed—as we may say dozens of resident medical officers in hospitals must have observed before—that patients have the same craving for the substitute as they have for an actual solution of morphine. A similar solution, disguised under the name "antiphymose," when injected subcutaneously, has caused marked improvement in cases of tuberculosis; patients so treated eat and sleep better and gain in weight. Dr. Mathieu does not claim novelty for this method of treatment but he lays stress on the fact that recourse to medication by suggestion may often enable the physician to recognise the purely nervous or psychic nature of some morbid manifestations. He further suggests that the use of simple salt injections affords a criterion for the valuation of new serums, which should not be regarded as efficacious unless they produce better results than are obtained by the combined psychic and physiological action of salt solution.

SEA-NETTLES.

A MAN, practically *in puris naturalibus*, would not voluntarily throw himself upon a bank of stinging nettles, although he would be confident that no real harm would ensue. The proceeding would be attended with inconvenience and some discomfort of course, but, generally speaking, there is nothing disastrous about the sting of the common urtica, and no fear is usually entertained of its results. All that is needed after being stung with nettles is a little patience, for, as a rule, the urticaria soon passes away, as every bare-legged child knows. The same is true in the case of the sea nettle or the jelly-fish but most persons exhibit a much greater dread of an encounter with a sea-nettle than with the common stinging nettle of our hedgerows. There are instances, of course, in which constitutional symptoms arise after the stings of the jelly-fish, but these, on the whole, are rare. The jelly-fish stings much in the same way as the nettle—that is, by means of an acrid fluid discharged through a filament. The filament may be barbed or serrated and is usually coiled within cells which turn inside out on contact or pressure and thus bring the filament into touch with the body, conveying the fluid through the surface penetrated. The ordinary stinging nettle is furnished with a stinging hair from which an acrid fluid escapes when the brittle tip is broken off by contact. When examined under the microscope the hair presents the appearance of a glass tube full of fluid. On breaking the top off, as by simple contact with the hand, it will be found that some of the fluid contents have been discharged. The sting of the jelly-fish, as a rule, produces merely superficial effects, and it is usually only the larger kinds which are venomous, the small ones being without effect at all. The most formidable creature of the class perhaps is the Cyanea capillata which is distinguished by a long train of ribbon-like streamers floating after it. Contact with these streamers may result in tortures of burning and prickling, which, however, are little worse than the effect produced by the ordinary stinging nettle. The Portuguese man-of-war (Physalia pelagica) appears to cause more alarming results, though, as a rule, they pass harmlessly away. There is a severe and stinging pain extending up the limb, sometimes with feverishness, and there are the usual wheals on the skin, and irritation. In the same way sea anemones will sting that part of the body brought into contact with their tentacles, but again the effects, though very irritating and possibly alarming at the time, are usually transient. On the whole, the stinging effects of jelly-fish have been exaggerated, and bathers in the sea need have no greater fear of them than of the ordinary stinging nettle. The urticaria caused by both is generally relieved by the application of a bland soothing oil.

IDENTIFICATION BY FINGER-PRINTS.

IN the last report of the Commissioner of City Police some interesting figures are given with reference to the results which have been recently obtained by the finger-print method in the identification of habitual criminals. Captain Nott Bower states that during the past year 1028 persons were arrested for offences under the Prevention of Crimes Act, such as being found in inclosed premises or in other circumstances suggestive of felonious intent. Of these individuals 562 were not recognised as recidivists at the time of their apprehension, but on their finger-prints being taken and compared with the Scotland Yard registers it was ascertained that 265 of them were old offenders. This result is a striking illustration of the practical value of the simple and rapid method which has been elaborated in this country by Mr E. R. Henry; and its significance is, of course, still greater when it is considered in connexion with the more radical methods of dealing with habitual criminals towards which public opinion is gradually moving. A perfectly safe test of identity is, in fact, the first condition precedent to the adoption of any scheme for eliminating the professional criminal, or at all events for restricting his mischievous activity, and for excluding the dangers of any such miscarriage of justice as occurred in the Beck case.

ARTERIAL EMBOLISM.

IN another column we publish the record of a case of mitral stenosis complicated with embolism of six main arteries. The patient was admitted into the St. Marylebone Infirmary suffering from cardiac disease and bronchitis. At first he improved under treatment and was able to be up all day. Suddenly symptoms of collapse developed, accompanied by severe pain in the legs and abdomen, paralysis of both lower limbs and of the left arm, and loss of sensation in both legs. Some of these symptoms abated but death ensued in the course of 24 hours. At the post-mortem examination there was well-marked constriction of the mitral valve with recent vegetations on the wall of the left auricle. Embolism of the following arteries was found: both common femorals, the right internal iliac at its bifurcation, the right renal at its division, the superior mesenteric just below the middle colic branch, and the left brachial at the origin of the superior profunda branch. Embolism as a complication of mitral stenosis is a fairly common phenomenon, and the arteries of the brain and of the kidneys are those most usually affected. Next in order of frequency are pluggings of the splenic arteries, and occasionally the arteries of the pancreas, the stomach, and the intestines are found blocked by emboli. In cases in which acute endocarditis, especially infective endocarditis, has supervened, the limitation of the emboli to the viscera is not so decided, for peripheral arteries may then be affected, more particularly the posterior tibial, brachial, and popliteal. The number of large vessels involved in the case recorded by Mr. R. S. Roper is of considerable interest, more especially as the cerebral vessels seem to have escaped altogether. Pulmonary

infarcts are also not uncommon in cases of infective endocarditis, but in this instance they did not occur. It would have been interesting to have obtained a bacteriological examination of the recent vegetations in the left auricle, although in the clinical course of the case there was nothing to suggest that the endocarditis was of an infectious nature.

SCHOOL TRAINING FOR HOME DUTIES OF WOMEN.

AT the recent meeting of the British Association for the Advancement of Science Professor Arthur Smithells, F.R.S., read a very interesting paper upon the subject of the training of women while still at school for home duties. He pointed out that in a number of homes it is impossible for the mothers to teach the children since the mothers have no knowledge, and even if they had the knowledge the children have to go out to work. In a different class of the community, where it might be thought that girls could be trained at home in matters regarding the management of the home, the training of the daughters cannot be properly carried out on account of the "ignorance, prejudice, and folly" of the domestic circle. Professor Smithells thinks, and we think with him, that a great deal of simple instruction in the elements of the household arts, and in the inculcation of clean and orderly habits of living, should be given at school, and he laid special stress upon the teaching of science. He alluded to many of the common phrases in use in a household as evidence of an absolutely unscientific attitude. The common phrases, "It has gone wrong," "The jelly won't set," "The meat won't keep," and "The fire won't draw" make up the language of superstition, for a demon of perversity is implied behind them, the true cause of the troubles being unknown. And here he pointed out how many schoolmistresses who have taken high degrees in science can give no intelligible account of the reasons why certain things happen, or do not happen, in a house—they do not know, for example, why washing soda "goes white or why brass goes green." We are in full sympathy with Professor Smithells's contention that even the most elementary scientific knowledge is absent from most of our households; every medical man must have noticed the fact. We are glad, therefore, to learn that he has found it possible to arrange a course of science lessons in which scientific discipline and scientific method can be inculcated by simple experimental work, based entirely on matters of the household and of daily life; "where," to use his own words, "the information acquired is truly useful knowledge; and where the minds of the pupils are awakened to the fact that the household is a laboratory of applied science." The way of the wife and mother of the future, to say nothing of that of the husband, would be rendered more easy if the home could be worked upon the lines suggested.

COLOURED URINE.

THE *Edinburgh Medical Journal* for June contains a useful article by Dr. W. Murrell and Dr. Wilson Hake on the various causes of abnormal colouration of the urine. In the majority of cases of blue or green urine the colour is due to the administration of methylene blue. A green colour may result from admixture of the methylene blue with the normal yellow colouring matter of the urine. Green urine may also be due to biliverdin, which may be easily recognised by its characteristic tests. In a small minority of cases blue or green urine is due to other causes, and although most of these are well known, a summary of them is of value and interest. Indigo-blue urine is rare; large quantities of indigo may be taken without affecting the urine. The indigo found in urine is formed from indican, a normal constituent and a derivative of indol, a product of intestinal digestion, and, of course, the quantity of indican in the urine is increased in cases of obstruction of the small intestine. Indican in the urine may also be due to the administration of certain drugs, such as creasote or turpentine. On oxidation indican readily splits up into indigo blue and potassium hydrogen sulphate. Urine containing indigo blue is always alkaline and usually in a state of decomposition. Black or dark urine may be due to several causes. In carboluria the urine is dark when passed or it becomes dark on exposure to air from the formation of hydroquinone. The colour is usually olive-green but may be smoky. Fuchsine, when administered in small doses, from one-half to one grain thrice daily, may also produce olive-green urine. In melanuria the urine is of the colour of *café-au-lait*. This condition occurs in malarial cachexia, in melanotic affections of the skin and liver, and after the ingestion of certain drugs, such as creasote and turpentine. On addition of nitric acid the urine becomes black from conversion of the chromogen of melanin into that substance. In hæmoglobinuria and hæmatoporphyrinuria the urine is of a port-wine colour. The latter condition occurs in sulphonal and trional poisoning. Excluding febrile urine loaded with urates and urine containing blood in quantity, red or purple urine may be due to the administration of a number of drugs. After taking the synthetic purgative "purgen" (dihydroxyl-phthalo-phenone) the urine is not coloured if acid but shows a deep crimson-red colour if alkaline. This colour is destroyed by acids and restored by alkalies. Purgatin (anthrapurpurin diacetate) colours the urine bright red. Pyoktanin or methyl-violet may impart its colour to the urine. Fuchsine, a derivative of aniline, produces a bright purple urine in doses of from one grain to three grains; in smaller doses, as already mentioned, the colour may be olive-green.

ACCIDENTS TO JOCKEYS.

WE have previously[1] drawn attention to the deficient care taken at many racecourses to insure prompt medical attention when accidents occur. A recent instance serves once more to emphasise the need of which we spoke. Accidents of one sort or another are almost necessarily of frequent occurrence at race meetings, and it seems to us a pity from every point of view that some adequate arrangement is not arrived at in every important racing centre between the authorities and the local medical profession. On the part of the latter, at any rate, we are certain that there would be every readiness to provide for the attendance of proper medical skill; so that the unfortunate victims of accident need incur no added danger from delay or from hurried, improvised, and ignorant assistance. The accidents that befall jockeys are often of just such a nature that their immediate skilled treatment plays an all-important part in determining the eventual favourable result. For often subsequent difficulties are met with and comparatively bad results obtained because the golden moments for proper treatment in the first instance were wasted through the non-appearance of the necessary surgical skill.

BACILLUS VIOLARIUS ACETONICUS: A NEW MICROBE PRODUCING ACETONE.

M. L. Bréaudat has described in the *Comptes Rendus* of June 5th, p. 1280, a new microbe which is capable of producing acetone at the expense of proteid matter. It is a chromogenic (violet) organism, colourless, oval in shape, and is readily stained by aniline colours though not by Gram's method. It was discovered in drinking water at

[1] THE LANCET, April 15th, 1905, p. 1015.

Saigon in Cochin China. Its most important property consists in the power of producing acetone in a solution of peptone. It is a facultative aerobic organism, developing at temperatures between 30° and 37° C. and producing spores on about the sixth day. It liquefies gelatin, reduces nitrates to nitrites without disengagement of gas, and coagulates milk. It has received the name bacillus violarius acetonicus.

THE APOTHECARY'S SYMBOLS.

Of thousands of medical men who daily write prescriptions probably very few know the origin of the signs of the apothecaries' table as they are written. The ignorance is excusable, for these signs can only be traced in the tangle of the abbreviations and contractions of mediæval MSS. There were more than 5000 contractions of Latin words in use in France between the seventh and sixteenth centuries, and more than 1000 are found in official documents in England during the Tudor period alone; in comparison, Chinese is almost simple. On account of the costliness of writing materials and the labour of transcription abbreviations and contractions were a necessity. The Romans, with the direct boldness which was a characteristic of their race, simply left out whole syllables of words in inscriptions and writings, but the mediæval clerk had not this courage. He essayed a conventional code of expression for the most frequent syllables. The commonest syllable in mediæval Latin was the termination "us." This was abbreviated in early cursive MSS. into ℣ which is the long *ſ* with a flat U written over it. In the rapid writing of the commoner volumes this sign degenerated into the two dots representing the top and bottom of the *ſ* which left a sign similar to our colon (:); thus m: came to represent "mus" and b: to represent "bus." This kind of expression for a contracted syllable is known by palæographists as a "ligature" and other ligatures were in frequent use. For a long period the contraction symbol ; (our semicolon) was one of those standing for "et," the dot representing e and the comma standing for the slurred remains of the cursive t. This semicolon came gradually to be written ⁊, which we can readily see is only a hasty, careless method of writing a semicolon without raising the pen. And we must remember that to raise a reed pen in rapid writing risked a blot, and blots were not favourably received in mediæval scriptoria. For a long period again this ligature (⁊ or ;) was confined to words ending in que or et, as in qn⁊ for *quandoque*, qn⁊ for *quoque*, a⁊ for *apparet*, o⁊ for *opertet*, l; for *licet*, t⁊ for *tenet*, and s; for *scilicet*. Afterwards the symbol was generalised to signify the omission of any final syllable, so that o⁊ came to mean *ounce* or *uncia*. When printed text arose the ⁊ at once became a z to suit the convenience of a limited fount of type, but before this change became general the symbol o⁊ had been slurred by hasty writing into ʒ and the lower weight of the drachma was derived from this as ʒ. The sign for the scruple ℈ is a "ligature" for sr, the long *ſ* being crossed by a cursive r.

THE COST OF VACCINATION.

OUR readers may remember that in the House of Commons on May 23rd Mr. John Johnson asked the President of the Local Government Board whether he had power by himself to reduce the fees paid to public vaccinators without having to appeal to Parliament or any other authority, and, if so, whether he would arrange for such reduction. Mr. Burns said in reply: "The Local Government Board is empowered in its own discretion to make rules and regulations with respect to the remuneration of public vaccinators. I am giving consideration to the regulations on this subject." We now understand that Mr. Burns has intimated that the regulations for the charges of vaccination will be dealt with by an order of the Local Government Board at some time in the autumn. This statement may foreshadow a reduction in the fees paid to public vaccinators, and those to whom such a reduction seems just should remember that the Vaccination Act of 1898 laid a large amount of extra work on the shoulders of these officials. The public vaccinator now has to visit the child's house and to perform the operation with special precautions. He has more clerical work to do than before and two or more statutory visits are required. Naturally, even under the minimum scale of fees, the cost of vaccination increased, and ever since the Act of 1898 came into force boards of guardians have been complaining all over the country of the great cost of vaccination. It may be that the system of vaccination in general will be transferred from the guardians of the poor to the public health authorities, but although some public vaccinators may earn their fees easily, others, especially in country districts, have to do an enormous amount of work for a very small fee, and may even be out of pocket through their vaccination work.

ELECTROLYTIC DISINFECTANT.

ATTENTION was first drawn to the peculiar nature of the powerful antiseptic action of partially electrolysed sea water in a series of bacteriological experiments made by THE LANCET Special Analytical Sanitary Commission in connexion with the Hermite process of sewage treatment by electricity which was tried on a small scale at Worthing in 1893.[1] It was shown that in the case of the bacillus typhosus the action of the electrolysed saline fluid was reduced to one half or less of its previous disinfecting power up to the first five or ten minutes of its operation, but, on the other hand, its efficiency seemed after this time to be not merely recovered in the stronger but even in the weaker solutions. It is probable, therefore, that the chlorine bodies formed some passing combination with the medium by which these substances acted as a carrier, so that the antiseptic was handed on again in an even more efficient form to the micro-organisms. A similar action takes place on adding the antiseptic to urine—that is to say, the antiseptic value tested in five minutes is reduced to about one-half on the addition of urine; but the antiseptic power which seems to have been lost, if it is given sufficient time to operate, is still available, as in 24 hours the solution with urine exerts the same influence as that without. It, in fact, seems more active. Samples of broth which had received comparatively small quantities of electrolysed saline solution even after several weeks contained a sufficient amount of available chlorine to be titrated in the form of iodine with arsenious acid or thiosulphate of soda. These experiments seem to us to account for the extraordinary disinfecting and deodorising power of electrolysed salt water. Putrid meat or fish offal, for example, is most effectually deodorised when immersed in the electrolysed fluid. There can be little doubt, however, that it is of the utmost importance that the electrolysed saline fluid should be permanent as regards its strength, as represented in terms of available chlorine. Unless attention is paid to certain details during the production of electrolytic fluid in the electrolysers, and to its treatment immediately after its output, the fluid will gradually lose its strength. Since describing the interesting installation at Poplar in THE LANCET of March 24th, 1906, p. 852, many improvements in a practical direction have been made, so that not only is an active antiseptic fluid turned out continuously and needing little attention, but one which keeps at a standard strength and is permanent. The solution used contains magnesium chloride and sodium chloride. Magnesium chloride used alone does not give satisfactory

[1] THE LANCET, May 28th, 1894, p. 1321.

results, while it more readily furnishes active chlorine compounds than the sodium salt. The solution is made faintly alkaline with caustic soda so as to prevent the formation and escape of free chlorine in the cells. The electric current is governed automatically in order to give constant results and to avoid overheating. The stability of the newly electrolysed fluid is secured by the addition of a proper quantity of caustic soda. At the Poplar installation a paddle with rubber flaps is rotated in the fluid at the moment when it leaves the electrolysers, and it is intimately mixed with some caustic soda solution. The resulting solution shows no loss of strength. It is probable that this procedure results in the formation of a double hypochlorite of magnesium and sodium which, unlike the corresponding salt of magnesium, is quite stable. The process is extremely simple and the plant requires only a minimum of attention, the output of the disinfecting fluid, constant in strength, being perfectly regular and continuous. Mr. F. W. Alexander, the medical officer of health of the borough of Poplar, has devoted considerable energy and time to reducing the installation to a thoroughly practical concern, with the satisfactory result that the plant works with complete smoothness. It is capable of turning out an almost unlimited volume of efficient disinfectant by merely supplying a saline fluid and switching on the current. In time of epidemic such an installation should be invaluable.

OFFICIAL DISBURSEMENTS OF COUNTY MEDICAL OFFICERS OF HEALTH.

FROM the extent of the area under his supervision a county medical officer of health may have to pay a considerable sum in the course of a year as travelling expenses, and the labour involved in official correspondence and the preparation of reports makes the assistance of a clerk almost indispensable. The details of petty finance involved in such matters, and in the general management of an office, can be easily shown in an account-book by anyone who has received a mercantile training, but to keep such books and to make cash in hand or overdrawn agree exactly with the balance of debit and credit columns is not proper employment for an official whose chief responsibility is connected with the limitation or prevention of infectious disease. There are, indeed, many able men to whom such minor duties are positively distasteful. An obvious solution of the difficulty is for the county council to allow the medical officer a definite sum in commutation of his expenses, based on the average of several recent years, and we are glad to learn that the Surrey county council has just taken this course in respect to Dr. Edward C. Seaton, who has been the county medical officer for over 15 years. In bringing the subject before the council preparatory to the consideration of it at the meeting held on July 31st Dr. Seaton mentioned among other details that the Income-tax Commissioners had for a long time allowed a deduction of £35 from the amount of his salary prior to assessment. At the meeting of July 31st the council decided to commute Dr. Seaton's necessary working expenses for an annual sum of £150, an arrangement which must be satisfactory to a busy man whose congenial subjects are sanitary science and epidemiology.

CONGENITAL ABNORMALITIES IN THE ABDOMEN.

MALFORMATIONS in the abdomen are not rare, and this is only what we should expect when we consider the large number of organs which it contains. Probably the most common of all is Meckel's diverticulum, but there are many other forms. In the "Mirror of Hospital Practice" in the present issue of THE LANCET we print an account of a case in which two abnormalities were found in the abdomen of a boy, five years old. A cyst was found attached to the pylorus, lying between the mucous and muscular coats and of a size sufficient to cause some obstruction. It contained some clear serous fluid. So far as we are aware cysts have not hitherto been described in this situation. The only suggestion we can make is that it may have been a barren hydatid cyst. In the same case was found an excessive development of a fold of peritoneum which has been called the "sacro-genital fold." It was so well marked as to be palpable per rectum. It does not appear, however, that it interfered definitely with the passage of fæces. Both of the conditions deserve to be put on record and their coincidence is remarkable.

HOMICIDE OR SUICIDE.

AN inquest held recently at Alford, Lincolnshire, respecting the death of a widow named Ann Powell, aged 69 years, recalls in certain measure two cases of death from mechanical violence followed by burning of the body which will always figure as *causes célèbres* in the annals of forensic medicine. Reference is here made to the Peasenhall and Norwich tragedies. The deceased woman, who lived alone, was undoubtedly the subject of delusional insanity. She was last seen alive about 10 P.M. on July 9th. At 9 A.M. on the following day smoke was seen issuing from her bedroom window. On the house being entered it was found that the furniture and other articles were scattered about in great confusion. A basket of clothes and some cooking utensils had been put outside the back door. The body was discovered in a sitting posture against the wall at the foot of the bed. A chopper with a hook, such as is used for cutting gorse, was found under her left thigh. The instrument was the property of the deceased. The only clothing on the body unconsumed by the fire was on the left arm, and that was burning. The day clothes were on the bed, and by the side of it there was a bloody skirt, and blood was on the pillow. A folding chair with blood on it was also on the bed. The bedstead at the foot was covered with blood. There was a piece of newspaper on a chair with blood and hair on it. The pictures had all been taken from the walls. A ladder by which there was access from the kitchen to the bedroom showed blood marks on the steps, as if made by naked feet. According to the police evidence the marks looked as though someone had been up and down the ladder. There was no proof that a robbery had been intended or committed. Mr. W. F. Dale, a surgeon at Alford, saw the body shortly after the discovery of the tragedy. He found the soles of the feet and palms of the hands covered with blood. There were no wounds on the hands or feet. He described the fatal injuries as follows: "At the back of the head there was a wound one and a half inches by two and a half inches and the scalp was pulped for about half an inch round. The skull was shattered and a portion driven into the brain in small pieces. There was a second wound one inch above and to the right of the other. There was a clot of blood between the scalp and the *left* frontal bone one and a half by one inch." The fracture of the skull at the site of the larger wound was the only injury of importance bearing on the question of homicide or suicide. The entire thickness of the bone had been cut in a slanting direction from below up and from left to right, beginning at the occipital protuberance. The divided surface of bone was coarsely grooved, showing that the blow had been delivered with a dull cutting instrument such as the chopper above referred to. Moreover, the upper end of the chopper exactly fitted the cleft of the bone. Either by reason of the bluntness of the instrument or by a wrenching action following on the initial blow the bone beyond was broken irregularly through. Mr. Dale was of opinion that there was no evidence of return foot-marks on the stairs, and the marks were not

smeared at the edges. These facts are at variance with the deposition of the police officer. Mr. Dale calculated that death had taken place from one and a half to two hours before the discovery was made. If this be correct it seems clear that the deceased could not have placed herself in the position in which her body was found, because no great amount of clothing had been consumed. An accidental fall of an unconscious or semi-conscious person into the sitting posture is highly improbable, especially as the body retained the position. Again, although a large quantity of blood had been lost from the scalp wounds, there was only the mark of blood where the head rested against the wall. None had trickled down it. Judging from recorded cases we must concede the possibility of a person with head injuries such as the deceased had received setting herself on fire or even going up and down stairs. Opposed to the theory of murder are the following facts. No robbery had taken place; no person would benefit materially by the death; blood stains were absent from the doors and windows and floor of the front room; the age of the deceased negatived a common motive for murder; and the position of the house, situated between and adjoining other houses in the main street would not make a murderous attack safe. Against this collective evidence, which the coroner's jury deemed sufficient to justify a judgment of "Death from suicide," was there sufficient to warrant one of two alternatives—homicide or an open verdict? We are of opinion there was. Mr. Dale, supported by his colleague, Dr. Thomas Edward Sandall, was positive that the injury to the skull could not have been self-inflicted. We have had the opportunity of examining the bone and we feel constrained to endorse their opinion. Apart from the position of the injury, suggestive at least of homicide, we have the facts that the bone was cut through at the thickest part of the skull; that it was done by a very dull instrument, as shown by the grooving of the sectional surface; that very great force must have been used, such probably as a woman, 69 years of age, would find it difficult to exert; and lastly, the direction in which the blow was given, from below up and from right to left. The coroner referred to the medical evidence given in the Camberley case as bearing upon the elucidation of the facts before him. In that case, he said, the medical man, although stating that the wounds on Miss Hogg's body were strongly suggestive of homicide, was of opinion that the theory of suicide could not be excluded. The quotation was correct but if the nature, site, and direction of the wounds had also been borne in mind he would have at once seen there was no parallel between the two cases. By practically ignoring Mr. Dale's testimony the jury, in our opinion, put themselves in an unenviable position, for should further evidence arise pointing to a different verdict it would be seen that their finding had, to say the least, tended to discourage continued investigation. On highly technical matters jurors should admit that they are justified in accepting the judgment of those best qualified to speak with authority. Moreover, if such judgment should ultimately prove to be erroneous the jury would be absolved from the charge of hasty or ill-considered reasoning.

SANITATION IN BERMONDSEY.

AT the recent quarterly meeting of the Bermondsey Municipal Association a discussion took place as to the advisability of discontinuing the practice of burning the refuse of the district in view of the great cost of running the destructor. The sanitary advantages of the system of cremating refuse were strongly advocated by Alderman Wilkinson, who was, however, met by some extraordinary arguments from the chairman, Mr. Hugh Colin Smith. This gentleman appears to have proclaimed a belief that street refuse when accumulated was a desirable adjunct to a neighbourhood or, at all events, to have said that the sorting of it, usual when it is not burnt, was a healthy occupation, because 100 years ago "all the great physicians used to prescribe for the ladies of the West-end who suffered from weak lungs a course of visits to the dust heaps of London, to stand over them and breathe the effluvia, because the gases emitted from decaying vegetable matter strengthened the chest." Mr. Hugh Colin Smith, if he desires to revert to the medical and sanitary methods of 100 years ago in the conduct of his own household, is quite welcome to do so as long as he does not thereby bring himself into collision with the law. He will, however, hardly find them applicable to the somewhat augmented population and changed conditions of life observable in Bermondsey since the early part of the last century, and we should recommend him to leave anecdote alone and to concentrate his attention, and that of the association over which he presides, upon bringing about the working of the destructor in question more economically rather than upon doing away with it altogether. The dust heaps to which he referred would by now have grown to mountains of respectable size had their augmentation been allowed to continue, but they would hardly have taken the place of the Highlands or of the Alps as a touring ground for those in search of a healthy holiday.

Colonel Kenneth Macleod, I.M.S., LL.D., honorary physician to the King, will deliver the address at the opening of the winter session of the London School of Tropical Medicine on Oct. 8th, when the Duke of Marlborough, the President of the society, will occupy the chair.

MEDICINE AND THE LAW.

Disinfection of Infected Clothing.

THE question of the powers and duties of sanitary authorities in regard to articles which have been exposed to infection and also of the liability of authorities who have ordered such articles to be destroyed or disinfected is one of considerable importance. The statutory provisions as to the disinfection of clothing, bedding, &c., are to be found in Section 120 of the Public Health Act, 1875, and Sections 5 and 6 of the Infectious Diseases (Prevention) Act, 1890 (if such sections have been adopted for the particular district). The first paragraph of Section 120 provides that "where any local authority are of opinion upon the certificate of their medical officer of health or of any other legally qualified medical practitioner" that any house or articles therein should be infected, "it shall be the duty of such authority to give notice in writing to the owner or occupier" requiring him to disinfect. In each case the authority must exercise its discretion upon the consideration of the certificate and the notice to the owner or occupier must be given by the authority itself and not by an officer upon his own initiative. If an officer does give such a notice it would seem that the authority cannot ratify it and that it will not support a summons for non-compliance (see St. Leonard's, Shoreditch, *v.* Holmes, 50 J. P. 132). In practice the result is most inconvenient and calculated to defeat the whole object of the section, for in cases of infection immediate action is necessary, yet nothing can be done until the next meeting of the authority. The last paragraph of the section provides that where the owner or occupier is "unable in the opinion of the local authority to carry out the requirements of this section such authority may, without enforcing such requirements on such owner or occupier, with his consent, cleanse and disinfect such house or part thereof or articles, and defray the expenses thereof." Upon this paragraph a question arises as to whether or not a previous notice in writing (based upon a certificate) is necessary; at the time the point is immaterial, for if an officer of the council in fact obtains the owner's consent, the clothing will be disinfected; but should injury be done to the clothing in the process of disinfection, as must frequently be the case, the answer to this

question may have an important bearing upon the right of the owner to recover compensation in respect of such injury. The case of Foster *v.* East Westmorland Rural District Council (68 J. P. 103) was one which raised a point of some interest as to the liability of a sanitary authority under Section 120 of the Public Health Act, 1875, in respect of articles damaged and destroyed by its officers in the process of disinfection. The plaintiff brought his action upon an award for £25 0*s.* 8*d.*, and the case was (by consent) argued upon a statement of facts found for the purpose by the umpire. It appeared that on Jan. 15th small-pox broke out in the plaintiff's house at B., and his medical attendant duly notified the fact. Thereupon the sanitary inspector went to the house and the question of disinfecting and destroying clothes, &c., was discussed between him and the plaintiff, the latter saying that he should expect compensation. Under the advice of the medical officer of health the patients were removed to the hospital, and on Jan. 20th the inspector's deputy attended and disinfected some articles and destroyed others, carrying out the work in accordance with written instructions previously given to him by the medical officer of health who had visited the house. Some of the articles so disinfected were damaged but it was not suggested that the damage was otherwise than unavoidable. The medical officer of health had given no certificate under Section 120 nor had any written notice been served upon the plaintiff under that section, but it was found as a fact that such notice would have been served had the plaintiff objected to the disinfection and destruction, but that he agreed because he thought he would be compensated. In addition to the articles above referred to other articles, the property of the plaintiff at O., were destroyed without his consent or knowledge. The umpire awarded £1 10*s.* for articles damaged in disinfection; £4 10*s.* for articles destroyed at B.; £9 for articles destroyed at O.; £5 5*s.* costs of arbitration; and £4 15*s.* 8*d* costs of award. This award was affirmed by the county-court judge, who held that where the authority itself disinfects with the owner's consent no previous notice in writing is necessary; that the medical officer was therefore carrying out the provisions of the statute; and that as the authority had adopted, or, at least, not disavowed, his acts, it must pay compensation. The practical difficulty in the efficient working of Section 120 of the Act of 1875, which has been referred to, is remedied by Section 5 of the Infectious Diseases (Prevention) Act, 1890, and wherever that section is adopted it supersedes Section 120. Under this section it is no longer necessary for the authority to consider any particular case; as soon as the necessary certificate is given the clerk must act upon it by serving the required notice. The section enacts as follows:—"(1) Where the medical officer of health of any local authority, or any other registered medical practitioner, certifies that the cleansing and disinfecting of any house, or part thereof, and of any articles therein likely to retain infection, would tend to prevent or check infectious disease, the clerk to the local authority shall give notice in writing to the owner or occupier of such house or part thereof that the same and any such articles therein will be cleansed and disinfected by the local authority at the cost of such owner or occupier unless he informs the local authority within 24 hours from the receipt of the notice that he will cleanse and disinfect the house or part thereof and any such articles therein to the satisfaction of the medical officer of health within a time fixed in the notice. (2) If within 24 hours from the receipt of the notice the person to whom the notice is given does not inform the local authority, or if, having so informed the local authority, he fails to have the house or part thereof and any such articles disinfected within the time fixed in the notice, the house or part thereof and articles shall be cleansed and disinfected by the officers of the local authority under the superintendence of the medical officer of health, and the expenses incurred may be recovered from the owner or occupier in a summary manner. (3) Provided that where the owner or occupier of any such house or part thereof is unable, in the opinion of the local authority or of their medical officer of health, effectually to cleanse and disinfect such house or part thereof and any articles therein likely to retain infection, the same may without any such notice being given, but with the consent of such owner or occupier, be cleansed and disinfected by the officers of, and at the cost of, the local authority." It will be noticed that in this clause the medical officer of health is expressly empowered to judge of the owner's ability to disinfect property. Section 6 also intrusts further discretion to the medical officer and allows him (if armed with a general authority to that effect) to require bedding, &c., to be handed over for disinfection at the cost of the authority. The Act of 1890 contains no general compensation clause and is not directed to be read as one with the Public Health Act, 1875. It seems, therefore, that if articles are damaged whilst being disinfected by the authority under Section 5 no compensation will be payable in respect of unavoidable damage and the remedy for unnecessary damage will be an action for negligence. Where, however, they are removed for disinfection under Section 6 it is expressly provided that compensation is to be paid in respect of unnecessary damage, the amount being settled by a court of summary jurisdiction. In Garlick *v.* Knottingley Urban District Council (68 J. P. 494) it was held that where articles which have been exposed to infection from any dangerous infectious disorder were destroyed by an inspector of nuisances acting on the order of the medical officer of health without express direction from, or ratification by, the urban authority, the owner of the articles has no claim for compensation against the urban authority under Sections 121 or 308 of the Act of 1875. The only provision under which an authority can destroy infected bedding or clothing is contained in Section 121 of the Act of 1875. The section does not require any certificate or notice, but merely says that the "authority may direct the destruction of bedding, clothing," &c. The result is that in the event of an outbreak of serious infectious disorder a medical officer is placed in a very difficult position; if, in the exercise of his own discretion, he orders the destruction of infected bedding he may find the authority refuse to approve his act, in which case he may be liable to an action for trespass, whilst if he must wait until the next meeting much mischief may be done. It is desirable, therefore, that a medical officer should obtain a general authority to direct the destruction of infected articles, at any rate in cases of serious illness such as small-pox.

"*Refreshing the Memory*" in Court.

The extent to which notes may be read by a witness under examination in a court of law with a view to refreshing his memory was raised lately and in a somewhat novel manner in the case of Holden *v.* the Prudential Life Insurance Company of America. A medical man was called as a witness. He stated that although he had examined the deceased man some years previously and in fact had in his hand a note taken at the time of that examination he had quite forgotten the patient and his particular circumstances. The testimony of this witness was objected to, an objection which the court of first instance allowed; on appeal, however, the Supreme Judicial Court of Massachusetts held that the medical witness should have been permitted to refresh his memory as to the facts of the case in question. This case must be compared with the decision in the Supreme Court of New York in 1904, that a nurse could not produce a clinical chart, regularly filled in, to prove the physical condition of a patient formerly under her care. It may be stated generally that it is far preferable for a witness to get up his evidence thoroughly before he submits to a public examination, and not to refer to notes during that ordeal; there is always a suspicion, when reading from alleged records, that the other side is employing a potent fallacy common to every species of real evidence; thus the witness seems to say: "This fact must be true. Here's my note. I made it at the time." Before contemporary records are allowed by a judge, and admitted to aid the memory of a medical witness, certain conditions must be fulfilled. The private note or memorandum which it is proposed to read must be sworn to be the original record and not a clean copy made for the purpose of the present examination in court; it must have been made contemporaneously with the event to which it refers and by the witness himself as soon after the clinical or post-mortem examination as possible; its reception rests with the presiding judge to allow or disallow. The notes quoted are open to the inspection of the court; since 1824 they have to this extent been a sort of exhibit. Only so much of the note as the witness refers to, however, can be inspected and commented upon by the court. Mr. Gladstone used to say: "The best memory is a record made at the time," and it behoves all medical men who may willy-nilly have to give medico-legal evidence to have at hand a full note as to what was discovered or advised when an examination was made of a person who figures later as a litigant, either personally or by his representatives.

Sketching Witnesses in Court.

The announcement has been made that in the Probate, Admiralty, and Divorce Division the practice of making drawings of witnesses, which afterwards figure as illustrations to newspaper reports of the trial, must be discontinued. The order of Sir John Gorell Barnes will be welcomed by none more than by medical witnesses, who come into court as a rule unwillingly and can feel nothing but annoyance at seeing ridiculous travesties of their features figuring often in very objectionable company, and usually in connexion with cases the unpleasant characteristics of which constitute their principal claim to public attention. The present regulation is confined to the division named, but it may set an example to be followed elsewhere. That it is needed is shown by the wide circulation which has been given to statements that in the court where the inquiry was held into the mental condition of the Marquis Townshend an artist actually set up a canvas with a view to the production of a large painting of the scene, that cameras were used, and that the paint brush as well as the pencil was employed in more than one instance. After this we might expect before long a pause in the hearing of a trial in a badly lighted court for the taking of a flash light picture such as we are familiar with at public dinners. The making of these sketches is an innovation which has arisen and increased with the modern craze for publicity in private matters and with the misguided enterprise of certain journalism; but those whose memories go back but a little way can recall how the late Mr. Justice Denman, a most dignified judge, and one with strong views on the decencies of life, forbade an artist to draw a witness in a *cause célèbre* arising out of the theft of a pearl. Many portraits of witnesses and accused persons have been drawn since then, and in many instances the mere fact of being sketched as well as stared at in a crowded court must have added to the discomfort and hardship endured by an unwilling victim. There is only this to be said for the practice—that the publication of the portraits of witnesses or of persons charged with offences may sometimes lead to results beneficial to the cause of justice by making their identity more easily recognised than would the mere publication of names which are possibly assumed. Against this must be set the badness of the likenesses which must render such desirable recognition of even less frequent occurrence than it would be otherwise, and also the distress and annoyance caused in the majority of cases without any possibility of compensating advantage. To members of the medical profession called as witnesses the annoyance must always be considerable, and, as we have observed, they will welcome the prohibition.

Looking Back.

FROM

THE LANCET, *SATURDAY*, August 16th, 1828.

POISONING BY PRUSSIC ACID.

THE attention of the public in this country has recently been directed to the subject of poisoning by Prussic Acid, in consequence of the suicide of a condemned felon, by this means; and, in France, at the present moment there is much excitation on the same subject, from the occurrence of a most lamentable catastrophe in one of the public hospitals; no less than SEVEN patients having been poisoned by the incautious use of it. ..... The account which has reached us, respecting the death of seven patients by prussic acid, in one of the French hospitals, (Bicêtre), is as follows:—M. Ferrus, one of the physicians, was in the habit of employing prussic acid in cases of epilepsy; and the formula which he used was that of Magendie, under the title of syrup of hydrocyanic acid, consisting of one part of medicinal prussic acid to 128 of syrup. In private practice, the medicine had always been procured at the shop of M. Pelletier, and an ounce was usually prescribed for a dose. M. Ferrus, wishing to try the medicine in the hospital, ordered it in the dose of an ounce to fourteen epileptic patients. The house surgeon represented to M. Ferrus, that drachm doses only were given, and that these occasionally produced unpleasant symptoms. This induced M. Ferrus to prescribe half an ounce, although he had, as before stated, usually directed half an ounce to his patients in private practice. The medicine was procured from the *Pharmacien Centrale des Hopitaux*, where the syrup is prepared according to the *Codex*, or French Pharmacopœia, which is, one part of prussic acid to nine parts of syrup. The Infirmary man commenced the exhibition on the 14 epileptics; by the time he had given it to the seventh the first was dead, and the others expired in the course of twenty minutes. Magendie uses the acid prepared according to the formula of Gay-Lussac; he adds six times its volume, or 8·5 times its weight of distilled water, and he then designated it medicinal prussic acid. The acid directed in the French Pharmacopœia, is prepared according to the process of Scheele, which, in the opinion of Magendie, is exceedingly uncertain in its results. The formula of Gay-Lussac, or of Vauquelin, should always be followed. Mr. Garden, of Oxford Street, prepares it according to Vauquelin; it is made at Apothecaries' Hall by Scheele's process.

HARDENING OF STEEL BY A CURRENT OF COMPRESSED AIR.

FROM the observation of travellers, that the manufacture of Damascus blades was carried on only during the time when north winds occurred, M. Anozoff made experiments on the hardening of steel instruments by putting them, when heated, into a powerful current of air, instead of quenching them in water. From the experiments already made, he expects ultimate success. He finds that, for very sharp-edged instruments, this method is much better than the ordinary one; that the colder the air and the more rapid the stream, the greater is the effect. The effect varies with the thickness of the mass to be hardened. The method succeeds well with case-hardened goods.

Public Health and Poor Law.

LOCAL GOVERNMENT BOARD.

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

The City of Liverpool.—The history of the sanitary advancement of the city of Liverpool is one of the most interesting in existence and the short account which Dr. E. W. Hope furnishes in his current annual report of the sanitary condition of Liverpool in the earlier part of the nineteenth century is one which must make the present citizens on the banks of the Mersey thankful that they were born a generation or more later. In 1841 the population of Liverpool was 223,000 (it is now 733,714) and of this number some 160,000 belonged to the working classes. Of these latter more than a third lived in courts and cellars, the courts being connected with the street by a passage or archway about three feet wide. The houses themselves were back to back and side to side, having no yards or open spaces at the sides or rear. As regards the cellars they were from 10 to 12 feet square, generally flagged but frequently having only the bare earth for a floor, the cellars being sometimes less than six feet in height. There was frequently no window, so that light and air could gain access to the cellar only by the door, the top of which was often no higher than the level of the street; consequently the cellars were dark and ventilation was out of the question. There was sometimes a back cellar used as a sleeping compartment and having no direct communication with the external atmosphere, deriving its scanty supply of light and air solely from the door of the front apartment. A population of over 20,000 inhabited these cellars and the whole of this population was without out-offices or places of deposit for their refuse matter. Speaking of the lodging-houses, Dr. Hope tells us, apparently on the authority of Dr. Duncan, who was health officer of the city for so many years, that in every room except the kitchen and common rooms the floor was covered with bedsteads, each of which received at night as many human beings as could be crowded into it, and this, too, often without distinction of sex or regard to decency. As to the cellars, Dr. Duncan himself said: "The floor of these cellars, often the bare earth, is covered with straw, and there the lodgers, all who can afford to pay 1*d.* for the accommodation, range themselves as best they may until scarcely a single available inch of space is left unoccupied."

The water-supply in 1845 was such that fires were frequently uncontrolled and the two water companies charged arrears due from a former tenant to the new one. "Large numbers of courts were destitute of water, the supply having been cut off for non-payment, and the inhabitants had no other water to use from year's end to year's end except what they begged or stole from their neighbours." Under these conditions we are but little surprised to read of fights and squabbles among the people in their efforts to get their vessels filled with water. From a report of Mr. Riddall Wood who investigated the state of education in the Liverpool of this time, it appears that the schools were dark and confined, damp and dirty and used as dwelling and dormitory by the teacher's family. 40 of these were cellars. Under these conditions typhus fever thrived and 1 person in 25 of the working-class population was annually attacked by this disease. And before the Liverpool Sanitary Act of 1846 had been brought into effective operation there came the potato famine of Ireland and by June, 1847, some 300,000 destitute Irish emigrants had landed in Liverpool. Many of these were transmigrants but some 80,000 filed into the lodging-houses and forced their way into cellars which had been closed under the Health Act of 1842. Typhus fever prevailed and ere long "the epidemic burst through the barrier which had hitherto seemed to confine it to the poorer classes of the inhabitants. ..... In one street, Lace-street, no less than 472 persons died from it and other causes during the year, being one-third of the entire population of the street." In 1849 cholera was introduced by emigrants, and in the course of that year 7000 deaths were ascribed to it and allied diseases. Dr. Hope, in describing the introduction of cholera by emigrants in 1866, quotes from Dr. Trench a vivid description of an Irish wake over the body of a woman dead from cholera. Dr. Trench was unable to procure speedy burial and after detailing the wake he adds: "There had been in the presence of death one of those shameful carousals which, to the disgrace of the enlightened progress and advanced civilisation of the nineteenth century, still linger as dregs of ancient manners among funeral customs. It was a rash challenge to the dreaded pestilence; and how and with what fearful results accepted the mortality returns of the next four months will too clearly show. Suffice it now to mention that before the period of a week had passed John Boyle, the husband of the woman, was also among the dead, and before the end of July 48 persons had died from cholera within a radius of 150 yards from the court which had been the scene of the ill-timed revelry." This writing of Dr. Trench reminds us rather of the pen of Sir John Simon, and the whole of Dr. Hope's retrospect makes admirable reading. It is indeed regrettable that there is no more of it and we would suggest its expansion with copious footnotes and references and its publication as a separate volume. It would serve to awaken the public to the change which sanitary science has wrought, not only in Liverpool but elsewhere.

The City of Birmingham.—In his current annual report Dr. John Robertson speaks well of the drinking water recently introduced into Birmingham from Rhyader in Wales. The water is still somewhat peaty at times but this drawback is gradually diminishing; in reaction the water is not acid but faintly alkaline, and its action on lead pipes only manifests itself when the water is allowed to remain in a new lead pipe overnight. In order to prevent the kettles used for the water from rusting certain manufacturers galvanised both the inside and outside of such kettles which were sold as "Welsh water kettles." It was discovered, however, that now and again as much as from five to eight grains of zinc per gallon were found in the water, a circumstance which rendered the water quite turbid. It was ascertained, too, that some of the cheaper kettles were lined with a mixture of tin and lead instead of with pure tin, and obviously illness from lead poisoning might result. The voluntary notification of pulmonary tuberculosis was introduced into Birmingham early in 1905, the notifications to be treated as confidential and the usual fees to be paid. Only such cases as are regarded as being in an infectious condition are to be notified and arrangements have been made for the gratuitous examination of sputum at the bacteriological laboratory of the University. Dr. Robertson points out that the cases which most require attention from the sanitary authority are those which occur among the more careless and ignorant of the population, and he thinks that among the middle and upper classes such notifications are not necessary, owing to the fact that the majority of the patients in these classes already receive the necessary instruction.

Willesden Urban District Council.—Dr. William Butler furnishes a table in his annual report for 1905 giving the results of the examination of the eyesight of 11,838 scholars attending the public elementary schools in Willesden. The vision was tested by the teachers under a scheme embodied in the regulations of the education committee. Among the boys 48·6 per cent. only had normal vision, 40·9 per cent. slightly defective vision, and 10·5 per cent. seriously defective vision. Among the girls 34·5 per cent. had normal vision, 49·3 slightly defective vision, and 16·2 per cent. seriously defective vision. Dr. Butler, referring to the above results, observes that "there is some evidence that a public conscience is being created as to the importance of attending to the vision of the children."

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

In 76 of the largest English towns 8988 births and 4188 deaths were registered during the week ending August 4th. The annual rate of mortality in these towns, which had been equal to 12·0 and 12·6 per 1000 in the two preceding weeks, further rose to 13·8 per 1000 in the week under notice. During the first five weeks of the quarter the death-rate in these towns has averaged 12·5 per 1000, the rate during the same period being 12·3 in London. The lowest death-rates in the 76 towns were 3·0 in West Bromwich, 4·2 in Hornsey, 7·6 in East Ham, 7·9 in Burton-on-Trent, 8·0 in Willesden, 8·1 in Wallasey, and 8·3 in Tottenham; the highest rates were 19·0 in Newport (Mon.), 19·7 in South Shields, 19·8 in Stockton-on-Tees, 20·3 in Rochdale, 20·5 in Wigan, 21·2 in Coventry, 21·4 in Huddersfield, and 26·9 in Bootle. The 4188 deaths in the 76 towns showed an increase of 375 on the number in the previous week, and included 753 which were referred to the principal epidemic diseases, against 361, 424, and 486 in the three preceding weeks; of these 492 resulted from diarrhœa, 108 from measles, 59 from whooping-cough, 43 from diphtheria, 31 from scarlet fever, and 20 from "fever" (principally enteric), but not any from small-pox. The deaths from these principal epidemic diseases were equal to an annual rate of 2·5 per 1000 in the 76 towns and to 2·6 per 1000 in London. No death from any of these epidemic diseases was registered in Hornsey, Bournemouth, Southampton, Ipswich, Burton-on-Trent, Handsworth, West Bromwich, Grimsby, Wallasey, Warrington, Barrow-in-Furness, Halifax, and Middlesbrough; while they caused death-rates of over 5·0 per 1000 in Leyton, Aston Manor, Bootle, and Huddersfield. The highest death-rates from measles occurred in Salford, Burnley, and Huddersfield; from whooping-cough in Portsmouth, Birkenhead, and Newport (Mon.); and from diarrhœa in West Ham, Leyton, Walsall, Aston Manor, Birkenhead, Bootle, Wigan, Leeds, and Merthyr Tydfil. Diphtheria caused ten deaths in London, four in Liverpool, and two each in Portsmouth, Bristol, Derby, and Hull; scarlet fever caused six deaths in London, five in Sheffield, two in Hanley (Staff.), two in Aston Manor, and two in Manchester; while of the 20 deaths referred to "fever," four belonged to London, two to West Ham, and two to Nottingham. One case of small-pox remained under treatment in the Metropolitan Asylums hospitals on August 4th against numbers declining from 13 to one at the end of the six preceding weeks; no new cases have been admitted during the past six weeks. The number of scarlet fever cases, which had been continuously rising from 2225 to 3043 on the 15 preceding Saturdays, had further risen to 3120. 415 new cases were admitted during the week, against 406, 413, and 408 in the three previous weeks. The deaths in London referred to pneumonia and other diseases of the respiratory organs, which had been 119, 133, and 101 in the three preceding weeks, rose to 111, and were eight below the corrected average in the corresponding week of the four preceding years 1902–05. The causes of 43, or 1·0 per cent., of the deaths registered in the 76 towns during the week under notice were not certified either by a registered medical practitioner or by a coroner. In 54 of the 76 towns, including West Ham, Bristol, Leicester, Hull, and Newcastle-on-Tyne, no uncertified death was registered; there were six in Birmingham, five in Liverpool

and in South Shields, four in London, two each in Nottingham, St. Helens, Salford, Leeds, and Sunderland, and one each in 13 other towns.

In 76 of the largest English towns 7361 births and 4424 deaths were registered during the week ending August 11th. The annual rate of mortality in these towns, which had slowly but steadily increased in the four preceding weeks from 11·7 to 13·8 per 1000, further rose to 14·8 in the week under notice. During the first six weeks of the current quarter the death-rate in these towns has not averaged more than 12·8 per 1000, the rate during the same period being 12·7 in London. The lowest death-rates in the 76 towns last week were 5·6 in Newport (Mon.), 5·9 in Reading, 6·5 in Handsworth and in Wallasey, and 6·6 in Hornsey; the highest death-rates were 20·6 in St. Helens, 21·2 in Salford, 22 0 in Hanley, and 23·0 in West Ham. The 4424 deaths in the 76 towns showed a further increase of 236 upon the low numbers returned in recent weeks, and included 1105 which were referred to the principal epidemic diseases, against numbers increasing from 361 to 753 in the four preceding weeks; of these, 865 resulted from diarrhœa, 103 from measles, 50 from whooping-cough, 39 from diphtheria, 27 from scarlet fever, 20 from "fever" (principally enteric) and one from small-pox. The deaths from these principal epidemic diseases were equal to an annual rate of 3·6 per 1000 in the 76 towns and to 3·9 in London. No death from any of these epidemic diseases was registered last week in Bournemouth, Tynemouth, Ipswich, Burton-upon-Trent, or King's Norton; while they caused death-rates exceeding 6·0 per 1000 in Salford, Wigan, Norwich, Nottingham, Aston Manor, Birkenhead, and West Ham. The deaths referred to diarrhœa, which had steadily increased in the nine preceding weeks from 50 to 492, further rose last week to 865; the highest annual rates from this disease last week were 5·1 in St. Helens, 6·0 in Wigan, 6·2 in Birkenhead, 6·6 in Nottingham, 7·6 in Aston Manor, and 10·2 in West Ham. The largest proportional fatality of measles occurred in Norwich, Huddersfield, South Shields, Burnley, and Salford; and from whooping-cough in Middlesbrough and Birkenhead. Scarlet fever caused ten deaths in London, four in Sheffield, and two in Hanley; and diphtheria 13 in London, three in Salford, and three in Hull. Of the 20 deaths referred to "fever" five were returned in London, three in Liverpool, two in Bradford, and two in Leeds. The fatal case of small-pox occurred in Liverpool. No case of small-pox remained under treatment in the Metropolitan Asylums hospitals on August 11th, against numbers declining from 13 to one at the end of the seven preceding weeks; no new case has been admitted in these hospitals since the end of June. The number of scarlet fever cases under treatment in the Metropolitan Asylums hospitals and in the London Fever Hospital, which had increased in the 16 preceding weeks from 2225 to 3120, had declined to 3051 on Saturday, August 11th; 308 new cases were admitted during the week under notice, against 413, 408, and 415 in the three preceding weeks. The deaths referred to pneumonia and other diseases of the respiratory organs in London, which had been 133, 101, and 111 in the three preceding weeks, were last week 112, and were 12 below the corrected average in the corresponding week of the four preceding years, 1902-05. The causes of 43, or rather less than 1 per cent., of the deaths registered in the 76 towns during the week under notice were not certified either by a registered medical practitioner or by a coroner. All the causes of death were duly certified in 59 of the 76 large towns, including Manchester, Bradford, Leeds, and Newcastle-upon-Tyne; the proportion of uncertified causes of death showed, however, a considerable excess in Liverpool, Sheffield, Preston, Gateshead, Blackburn, and Hull.

HEALTH OF SCOTCH TOWNS.

The annual rate of mortality in eight of the principal Scotch towns, which had been equal to 14·3, 13·7, and 14·3 per 1000 in the three preceding weeks, decreased to 11·8 in the week ending August 4th, and was 2·0 per 1000 below the rate in the preceding week in the 76 large English towns. The rates in the eight Scotch towns ranged from 7·2 in Paisley and 8·2 in Leith to 15·1 in Perth and 15·5 in Dundee. The 405 deaths in the eight towns showed a decrease of 64 on the number in the previous week, and included 25 which were referred to diarrhœa, 11 to whooping-cough, eight to measles, four to "fever," one to scarlet fever, and one to diphtheria, but not any to small-pox. In all, 50 deaths resulted from these principal epidemic diseases in the week under notice, against 40 and 55 in the two preceding weeks; they were equal to an annual rate of 1·5 per 1000, which was 1·0 per 1000 below the rate from the same diseases in the 76 large English towns. The deaths attributed to diarrhœa in the Scotch towns, which had been 11 and 23 in the two preceding weeks, further rose to 25, of which 18 occurred in Glasgow, four in Edinburgh, and two in Dundee. The 11 fatal cases of whooping-cough agreed with the number in the previous week, and included seven in Glasgow and two in Aberdeen. The eight deaths referred to measles, which had been 12, seven, and six in the three preceding weeks, included five in Edinburgh and three in Glasgow. The four fatal cases of "fever" included two of cerebro-spinal fever, both of which were registered in Glasgow. The deaths in the eight towns referred to diseases of the respiratory organs, including pneumonia, which had been 59, 66, and 52 in the three preceding weeks, rose again to 61, and were 13 above the number in the corresponding period of last year. The causes of seven, or 1·7 per cent., of the deaths registered in the eight towns in the week under notice were not certified, the proportion in the 76 large English towns during the same week being only 1·0 per cent.

The annual rate of mortality in eight of the principal Scotch towns, which had been 13·7, 14·3, and 11·8 per 1000 in the three preceding weeks, rose again to 14·0 during the week ending August 11th and was 0·6 below the mean rate in the same week in the 76 English towns. The rates in the eight Scotch towns ranged from 10·2 and 11·4 in Paisley and Leith to 15·2 in Glasgow and in Dundee and 18·1 in Perth. The 481 deaths in the eight towns exceeded the number in the previous week by 76 and included 34 which were referred to diarrhœa, 11 to measles, eight to whooping-cough, six to "fever," three to diphtheria, and one each to scarlet fever and chicken-pox. In all 64 deaths resulted from these principal epidemic diseases in the week under notice, against 55 and 50 in the two preceding weeks; they were equal to an annual rate of 1·9 per 1000, which was 1·7 below the rate from the same diseases in the 76 large English towns. The deaths attributed to diarrhœa in the Scotch towns, which had been 11, 23, and 25 in the three preceding weeks, further rose last week to 34, of which 18 occurred in Glasgow, four in Dundee, three in Greenock, and two each in Edinburgh, Leith, and Aberdeen. Of the 11 fatal cases of measles, five occurred in Glasgow and five in Edinburgh; and six of the eight deaths from whooping-cough were returned in Glasgow. The six deaths referred to "fever" included five in Glasgow, all of which were certified as resulting from cerebro-spinal meningitis. Two of the three fatal cases of diphtheria, and the death from chicken-pox were also recorded in Glasgow. The deaths in the eight towns referred to diseases of the respiratory organs, including pneumonia, which had been 52 and 61 in the two preceding weeks, further rose to 68, and exceeded by 35 the low number returned in the corresponding week of last year. The causes of four, or rather less than 1 per cent., of the deaths registered during the week were not certified, corresponding with the proportion of uncertified causes of death during the same week in the 76 large English towns; all the four uncertified deaths were returned in Glasgow.

HEALTH OF DUBLIN.

The annual death-rate in Dublin, which had been equal to 20·9 and 20·1 in the two preceding weeks, declined further to 16·8 per 1000 during the week ending August 4th. During the five weeks of the present quarter the death-rate has averaged 18·7 per 1000, the rates during the same period being 12·3 in London and 12·7 in Edinburgh. The 122 deaths of Dublin residents during the week under notice showed a decrease of 24 from the number in the preceding week, and included 11 which were referred to diarrhœa, two to whooping-cough, and one to "fever," but not any to small-pox, measles, scarlet fever, or diphtheria. These 14 deaths from the principal epidemic diseases showed a slight decline from the numbers in the preceding week and were equal to an annual rate of 1·9 per 1000, the death-rate from the same diseases being 2·6 in London and 1·8 in Edinburgh. The 11 fatal cases of diarrhœa were one in excess of the number in the previous week. The 122 deaths from all causes in Dublin included 28 of children under one year

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING JULY, 1906.

(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated population in the middle of 1906.	NOTIFIED CASES OF INFECTIOUS DISEASE.										DEATHS FROM PRINCIPAL INFECTIOUS DISEASES.										Deaths from all causes.	Death-rate per 1000 living.	Deaths of infants under one year to 1000 births.
		Small-pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever.	Erysipelas.	Cholera.	Total.	Annual rate per 1000 persons living.	Small-pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Typhus fever.	Enteric fever.	Other continued fevers.	Diarrhœa.	Total.	Annual rate per 1000 persons living.			
LONDON	4,721,217	—	1688	630	—	98	2	25	344	—	2787	7·7	—	126	41	41	60	—	74	1	189	482	1·3	4179	11·3	96
West Districts.																										
Paddington	148,913	—	52	16	—	—	—	1	13	—	82	7·2	—	2	—	1	—	—	—	—	6	9	0·8	96	8·4	48
Kensington	180,952	—	43	20	—	2	—	1	10	—	76	5·5	—	13	1	2	3	—	—	—	4	23	1·7	168	12·1	121
Hammersmith	120,679	—	47	28	—	1	—	—	7	—	83	9·0	—	1	—	3	2	—	—	—	8	14	1·5	98	10·6	100
Fulham	161,965	—	57	30	—	4	—	2	7	—	100	8·0	—	6	—	—	1	—	1	—	9	17	1·4	108	8·7	77
Chelsea	74,672	—	23	7	—	1	—	1	6	—	39	6·8	—	3	—	—	—	—	—	—	—	3	0·5	50	8·7	70
City of Westminster	173,905	—	43	21	—	5	1	—	6	—	76	5·7	—	5	—	2	2	—	2	—	3	12	0·9	135	10·1	99
North Districts.																										
St. Marylebone	128,560	—	31	15	—	1	—	1	10	—	58	5·9	—	11	1	2	1	—	—	—	7	22	2·2	143	14·5	97
Hampstead	89,633	—	69	5	—	1	—	—	5	—	80	11·6	—	2	2	1	—	—	1	—	1	7	1·0	57	8·3	29
St. Pancras	236,455	—	76	23	—	4	—	1	22	—	126	6·9	—	7	3	—	3	—	—	—	5	18	1·0	220	12·1	76
Islington	344,987	—	108	40	—	15	—	1	12	—	176	6·7	—	8	1	3	8	—	3	—	13	36	1·4	184	10·7	74
Stoke Newington	53,217	—	11	3	—	—	—	—	2	—	16	3·9	—	2	—	—	—	—	—	—	1	3	0·7	33	8·1	73
Hackney	230,721	—	60	23	—	4	1	1	19	—	113	6·4	—	3	3	1	1	—	1	—	11	20	1·1	165	9·3	99
Central Districts.																										
Holborn	55,805	—	12	3	—	3	—	—	3	—	21	4·9	—	4	—	—	—	—	—	—	—	4	0·9	59	13·8	70
Finsbury	97,466	—	45	18	—	2	—	1	6	—	72	9·6	—	6	1	3	4	—	1	—	4	19	2·5	135	18·1	113
City of London	21,367	—	15	2	—	—	—	—	2	—	19	11·6	—	1	—	—	—	—	—	—	2	3	1·8	23	14·0	111
East Districts.																										
Shoreditch	116,108	—	71	10	—	1	—	—	8	—	90	10·1	—	4	2	—	1	—	—	—	7	14	1·6	109	12·2	106
Bethnal Green	130,609	—	64	31	—	3	—	2	28	—	128	12·8	—	3	—	1	1	—	1	—	8	14	1·4	128	12·8	90
Stepney	307,176	—	95	62	—	5	—	1	25	—	188	8·0	—	4	5	4	4	—	—	—	23	40	1·7	295	12·5	85
Poplar	170,673	—	33	28	—	8	—	—	16	—	85	6·5	—	13	—	1	—	—	1	—	8	28	2·1	173	13·2	106
South Districts.																										
Southwark	209,143	—	165	25	—	7	—	—	28	—	225	14·0	—	5	8	2	1	—	1	—	13	30	1·9	270	14·3	112
Bermondsey	128,629	—	52	26	—	1	—	1	12	—	92	9·3	—	6	—	2	3	—	—	—	9	20	2·0	168	17·0	126
Lambeth	315,774	—	92	37	—	5	—	3	14	—	151	6·2	—	1	1	2	3	—	6	1	15	29	1·2	257	10·6	79
Battersea	179,622	—	68	14	—	2	—	2	8	—	94	6·8	—	9	3	3	7	—	—	—	6	28	2·0	149	10·8	82
Wandsworth	273,381	—	75	33	—	8	—	2	20	—	138	6·6	—	3	—	1	8	—	2	—	7	21	1·0	214	10·2	97
Camberwell	274,132	—	78	28	—	5	—	1	23	—	135	6·4	—	—	4	2	2	—	4	—	4	16	0·8	228	10·8	89
Deptford	115,496	—	55	23	—	1	—	2	16	—	97	10·9	—	1	—	4	1	—	—	—	7	13	1·5	85	9·6	66
Greenwich	105,350	—	52	23	—	4	—	1	6	—	86	10·6	—	—	2	—	1	—	—	—	3	6	0·7	81	10·0	69
Lewisham	148,463	—	51	18	—	3	—	—	5	—	77	6·8	—	—	1	1	2	—	—	—	3	9	0·8	93	8·2	32
Woolwich	127,345	—	44	13	—	1	—	—	4	—	62	6·3	—	—	1	—	1	—	—	—	2	4	0·4	95	9·7	52
Port of London	—	—	—	—	—	1	—	—	1	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1

* Including membranous croup

of age and 36 of persons aged 60 years and upwards; both these numbers showed a considerable increase on those returned in the previous week. Four inquest cases and two deaths from violence were registered; and 48, or 39 per cent., of the deaths occurred in public institutions. The causes of three, or 2·5 per cent., of the 122 deaths were not certified either by a registered medical practitioner or by a coroner, the proportion of uncertified deaths in London being 0·3 per cent. and in Edinburgh 1·4 per cent.

The annual death-rate in Dublin, which had been equal to 20·9, 20·1, and 16·8 per 1000 in the three preceding weeks, rose again to 17·3 during the week ending August 11th. During the first six weeks of the current quarter the death-rate in the city averaged 18·5 per 1000, the rates during the same period being 12·7 in London and 12·8 in Edinburgh. The 126 deaths of Dublin residents during the week under notice showed an increase of four upon the number in the previous week, and included ten which were referred to diarrhœa, three to whooping-cough, two to "fever," two to measles, two to diphtheria, and not one either to scarlet fever or small-pox. These 19 deaths from the principal epidemic diseases showed an increase of five upon the number in the previous week, and were equal to an annual rate of 2·8 per 1000, the death-rate from the same diseases being 3·9 in London and 1·4 in Edinburgh. The ten fatal cases of diarrhœa in Dublin were fewer by one than the number in the previous week, while the fatality of other epidemic diseases showed an increase. The deaths of infants showed a considerable further increase last week, whereas those of elderly persons showed a decline. Three inquest cases and three deaths from violence were registered; and 39, or 31 per cent., of the deaths occurred in public institutions. The causes of five, or nearly 4 per cent., of the 126 deaths were not certified either by a registered medical practitioner or by a coroner, while all the causes of death were duly certified in Edinburgh and all but two of the 1352 deaths in London.

VITAL STATISTICS OF LONDON DURING JULY, 1906.

In the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases it appears that the number of persons reported to be suffering from one or other of the nine diseases specified in the table was equal to an annual rate of 7·7 per 1000 of the population, estimated at 4,721,217 persons in the middle of the year. In the three preceding months the rates had been 5·9, 6·4, and 7·6 per 1000 respectively. The lowest rates last month were recorded in Kensington, the City of Westminster, St. Marylebone, Stoke Newington, and Holborn; and the highest rates in Hampstead, the City of London, Bethnal Green, Southwark, Deptford, and Greenwich. No cases of small-pox were notified last month, against one, six, and ten in the three preceding months. The Metropolitan Asylums hospitals contained one small-pox patient at the end of last month, against six, five, and 11 at the end of the three preceding months. The prevalence of scarlet fever showed a slight excess in July as compared with the previous month; this disease was proportionally most prevalent in Hampstead, Finsbury, the City of London, Shoreditch, Bethnal Green, Southwark, Deptford, and Greenwich. The Metropolitan Asylums hospitals contained 3004 scarlet fever patients at the end of last month, against 2192, 2462, and 2705 at the end of the three preceding months; the weekly admissions averaged 395, against 282, 321, and 254 in the three preceding months. Diphtheria was considerably more prevalent than in the preceding month; the greatest proportional prevalence of this disease was recorded in Hammersmith, Bethnal Green, Stepney, Bermondsey, Deptford, and Greenwich. The number of diphtheria patients in the Metropolitan Asylums hospitals, which had been 860, 760, and 782 at the end of the three preceding months, had further risen to 872 at the end of last month; the weekly admissions averaged 135, against 103, 96, and 114 in the three preceding months. The prevalence of enteric fever was considerably less than in the preceding month; amongst the various metropolitan boroughs this disease was proportionally most prevalent in Islington, Holborn, Poplar, Southwark, and Greenwich. There were 99 enteric fever patients under treatment in the Metropolitan Asylums hospitals at the end of the three preceding months; the weekly admissions averaged 15, against 11, 12, and 20 in the three preceding months. Erysipelas was proportionally most prevalent in St. Pancras, the City of London, Bethnal Green, Southwark, Bermondsey, and Deptford. The 25 cases of puerperal fever included three belonging to Lambeth, and two each to Fulham, Bethnal Green, Battersea, Wandsworth, and Deptford.

The mortality statistics in the table relate to the deaths of persons actually belonging to the various boroughs, the deaths occurring in public institutions having been distributed among the boroughs in which the deceased persons had previously resided. During the four weeks ending July 28th 4079 deaths of persons belonging to London were registered, equal to an annual rate of 11·3 per 1000 of the population; in the three preceding months the rates had been 17·0, 13·8, and 11·9 per 1000. The death-rates last month ranged from 8·1 in Stoke Newington, 8·2 in Lewisham, 8·3 in Hampstead, 8·4 in Paddington, and 8·7 in Fulham and in Chelsea, to 13·8 in Holborn, 14·0 in the City of London, 14·3 in Southwark, 14·5 in St. Marylebone, 17·0 in Bermondsey, and 18·1 in Finsbury. The 4079 deaths from all causes in London last month included 482 which were referred to the principal infectious diseases; of these, 126 resulted from measles, 41 from scarlet fever, 41 from diphtheria, 60 from whooping-cough, 25 from "fever" (chiefly enteric), and 189 from diarrhœa. Among the metropolitan boroughs these diseases caused the lowest rates in Paddington, Chelsea, Stoke Newington, Camberwell, Greenwich, Lewisham, and Woolwich; and the highest rates in St. Marylebone, Finsbury, Poplar, Southwark, Bermondsey, and Battersea. The 126 deaths from measles were ten fewer than the corrected average number in the corresponding periods of the four preceding years; this disease was proportionally most fatal in Kensington, St. Marylebone, Holborn, Finsbury, and Poplar. The 41 fatal cases of scarlet fever were seven in excess of the corrected average number; the greatest proportional mortality from this disease occurred in Hampstead, Shoreditch, Southwark, Battersea, Greenwich, and Lewisham. The 41 deaths from diphtheria were seven fewer than the average for the corresponding period of the four preceding years; among the various metropolitan boroughs diphtheria was proportionally most fatal in Hammersmith, St. Marylebone, Finsbury, Bermondsey, Battersea, and Deptford. The 60 fatal cases of whooping-cough showed a decline of 51 from the corrected average number; the highest death-rates from this disease were recorded in Islington, Finsbury, Bermondsey, Battersea and Wandsworth. The 25 deaths from "fever" were six fewer than the average for the corresponding periods of the four preceding years; of these 25 deaths seven belonged to Lambeth, four to Camberwell, three to Islington, two to the City of Westminster, two to Wandsworth, and one each to seven other boroughs. The 189 fatal cases of diarrhœa were 134 below the corrected average number; among the various metropolitan boroughs this disease was proportionally most fatal in Hammersmith, Shoreditch, Bethnal Green, Stepney, Southwark, and Bermondsey. In conclusion, it may be stated that the aggregate mortality in London last month from the principal infectious diseases was 30 per cent. below the average.

Infant mortality, measured by the proportion of deaths among children under one year of age to registered births, was equal to 66 per 1000. The lowest rates of infant mortality were recorded in Paddington, Hampstead, Deptford, Greenwich, Lewisham, and Woolwich.

THE SERVICES.

ROYAL NAVY MEDICAL SERVICE.

The following appointments are notified:—Fleet Surgeons: G. A. S. Bell to the *President*, additional, for examination of Royal Marine candidates; D'Arcy Harvey to the *President*, additional, for three months' course at West London Hospital. Surgeons: E. A. G. Wilkinson to the *Pembroke*, additional, for disposal (lent to Yarmouth Hospital, temporary). Civil Practitioner S. E. Barrett to be Surgeon and Agent at Tillingham, Bradwell, and Stangate.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Charles J. W. Tatham retires on retired pay (dated August 11th, 1906). Lieutenant-Colonel Robert Caldwell has joined the Southern Command and assumed the duties of Specialist Sanitary Officer, Western area, in place of Major C. J. Willmer Tatham, who has filled

that post at Devonport for some time past. Captain Charles S. Cato resigns his commission (dated August 15th, 1906).

Captain R. A. Cunningham has arrived for duty at Gosport. Lieutenant E. G. Anthonisz has left the Southern Command for duty at Colchester.

THE PRINCIPAL MEDICAL OFFICER IN INDIA.

Surgeon-General W. L. Gubbins, C.B., M.V.O., A.M.S., has been appointed to Lord Kitchener's staff as Principal Medical Officer of His Majesty's forces in India, in succession to Sir Thomas Gallwey, K.C.M.G., C.B., transferred to Aldershot.

IMPERIAL YEOMANRY.

2nd County of London (Westminster Dragoons): Frederic William Longhurst to be Surgeon-Lieutenant (dated July 16th, 1906). Lothians and Berwickshire: John McWatt (formerly Surgeon-Lieutenant, 2nd (Berwickshire) Volunteer Battalion the King's Own Scottish Borderers), to be Surgeon-Lieutenant (dated July 7th, 1906). Suffolk (The Duke of York's Own Loyal Suffolk Hussars): Surgeon-Lieutenant L. A. Avery to be Surgeon-Captain (dated August 15th, 1906). Sussex: Surgeon-Lieutenant J. H. Dauber to be Surgeon-Captain (dated August 15th, 1906).

VOLUNTEER CORPS.

Royal Engineers (Volunteers): 2nd (Leeds) Yorkshire (West Riding): Alexander Brodie Seton Stewart to be Surgeon-Lieutenant (dated August 15th, 1906).

Rifle: 1st Lanarkshire Volunteer Rifle Corps: Surgeon-Major F. V. Adams is borne as Supernumerary whilst holding the appointment of Brigade-Surgeon-lieutenant-Colonel, Senior Medical Officer, Scottish Rifle Volunteer Infantry Brigade (dated July 3rd, 1906). 2nd Volunteer Battalion the Oxfordshire Light Infantry: Hubert de Burgho Dwyer to be Surgeon-Lieutenant (dated August 3rd, 1906). 2nd Volunteer Battalion the Sherwood Foresters (Nottinghamshire and Derbyshire Regiment): Surgeon-Captain and Honorary Surgeon-Major J. H. Maclean resigns his commission, with permission to retain his rank and to wear the prescribed uniform (dated August 11th, 1906). 1st Nottinghamshire (Robin Hood) Volunteer Rifle Corps: Surgeon-Captain R. H. Cordeux resigns his commission (dated August 11th, 1906). 2nd Volunteer Battalion the Duke of Cambridge's Own (Middlesex Regiment): Surgeon-Captain E. Farr resigns his commission (dated August 11th, 1906).

ROYAL ARMY MEDICAL CORPS (VOLUNTEERS).

Scottish Command: Edinburgh Company: Lieutenant D. Waterston to be Captain (dated August 11th, 1906).

DEATHS IN THE SERVICES.

Deputy Surgeon-General Henry Fowle Smith, A.M.D. (retired), recently, at the age of 83 years. He joined the army as an assistant surgeon in March, 1847, and having taken the M.D. of the University of Aberdeen in 1850, served throughout the Eastern Campaign of 1854-55, being attached to headquarters. He had medical charge of the staff belonging to the adjutant and quartermaster-general's department, and was subsequently on the personal staff of Sir James Simpson and Sir William Codrington. He was present at the action of Bulganar, at the battles of the Alma, Balaclava, and Inkerman, and throughout the siege of Sebastopol until the fall of the fortress (medal with four clasps, Turkish medal, and the Fifth Class of the Medjidie). In 1867 he was promoted to be surgeon-major. He retired in 1875, with the rank of deputy surgeon-general.

Correspondence.

"Audi alteram partem."

STOMATITIS DUE TO A MERCURIAL INJECTION GIVEN FIVE MONTHS PREVIOUSLY.

To the Editors of THE LANCET.

SIRS,—The case reported by M. P. Menetrier and M. Bouchard and referred to by you in an annotation in THE LANCET of August 11th, p. 386, as exemplifying the dangers of mercurial poisoning by the injection of "grey oil," is the best object-lesson I have yet read to illustrate the results of disregarding one of the first rules followed by the advocates of the intramuscular method—viz., that the mercury must be injected into the muscles and not merely deposited in the subcutaneous tissue. I venture to assert that in the case referred to the poisoning occurred in consequence of faulty technique, as the mercury never reached the muscles at all but, as M. Menetrier and M. Bouchard themselves state, was discovered in the subcutaneous tissue where it had remained temporarily encapsuled.

An injection may fail to be absorbed for many reasons. Firstly, the needle used may not be long enough to reach the muscle through the fatty tissue which is often very plentiful in the gluteal region. Secondly, the needle, though long enough, may not be passed in sufficiently deeply. Thirdly, the locality chosen for the injection may not be a suitable one: for example, if the injection is given too high up in the buttock where the muscular layer is thin absorption is likely to be slow. In a case of my own where injections were given to a stout patient with a short needle, in spite of the fact that several injections had been given the patient's condition did not improve and, a doubt arising as to whether the mercury was being absorbed, a radiograph was taken which showed each dose that had been administered lying in a lump in the subcutaneous tissue. The collections of mercury left by these injections could be both felt in the tissues as nodes and seen in a radiograph for some six weeks afterwards.

In contrast to this a series of radiographs of my patients show that mercury when injected into the muscles themselves spreads out in strize along the course of the muscular fibres, in which position the looseness of the tissues and their constant state of motion render encapsulation impossible. There is never any node to be felt and a few weeks are always sufficient to obliterate all radiographic evidence of mercury. My assistants and I have pursued this method for over two years, during which time we have had upwards of 200 cases of syphilis under our care in private and hospital practice. Some of these patients have received as many as 40 or 50 injections of grey oil without any ill-effects.

I am, Sirs, yours faithfully,

Liverpool, August 14th, 1906. STOPFORD TAYLOR.

P.S.—A similar explanation might also apply to the cases of mercurial poisoning occurring in the Egyptian command in 1901 and reported in the Army Medical Report of 1904.

THE BELATED LUNACY REPORT.

To the Editors of THE LANCET.

SIRS,—May I draw attention to the fact that the sixtieth annual report of the Lunacy Commissioners is not yet issued? In view of the great increase of lunacy and the projected appointment of a Royal Commission of inquiry may I urge upon the Lord Chancellor—to whom these reports are addressed—to see that the sixtieth report is issued without any further delay than is absolutely necessary? The fifty-ninth report is dated June, 1905. The cost of pauper lunacy for 1904 was £2,286,652; for 1905 this huge sum will be greatly exceeded.

I am, Sirs, yours faithfully,

H. R. GAWEN GOGAY.

Southchurch Beach, Essex, August 11th, 1906.

THE LESSON OF THE PERKIN JUBILEE.

To the Editors of THE LANCET.

SIRS,—Your readers will all be interested in your account of the jubilee of Sir William Henry Perkin, the discoverer of the first aniline dye, but I think it important that the true lesson of this jubilee should be pointed out. There is no gainsaying the fact that the aniline industry was originally an English industry and one we could carry on to the greatest advantage but that to-day the aniline dyes and the other valuable compounds derived from coal tar by synthetic chemistry are made in Germany. The reason for this is not far to seek. If to-morrow a chemist discovered a synthetic process for making quinine at say 1*s.* an ounce and he took his process to any body of capitalists they undoubtedly would start the works for making the quinine in Germany rather than in England for two reasons: (1) that under the German patent laws a patent is only valid for two years unless the article is made in Germany; and (2) if the works are to be in Germany the manufacturer has an open market

of 60,000,000 in Germany and 40,000,000 in the British Isles, while if he puts his works down in England he has only 40,000,000 in England, with 60,000,000 in Germany being closed to him by tariff. For the sake of making a fair comparison I have left out of consideration other countries. If I am wrong I should be very glad to be put right by any of your Free Trade readers.

I am, Sirs, yours faithfully,

SIDNEY BARWISE, M.D. Lond., B.Sc. Birm.

Duffield, near Derby, August 8th, 1906.

"FLAGELLA OR PSEUDOPODIA?"

To the Editors of THE LANCET.

SIRS,—In Dr. E. H. Hunt's very interesting note *re* the discovery of flagellated protozoa in a rectal abscess caused by the swallowing of a fish-bone, which appeared in THE LANCET of July 28th, p. 216, he states that "the outer coat was very thin and easily protruded when the organism came in contact with pus cells," though he does not seem to connect this property of the amœbæ with the formation of the flagella; he admits that after six hours the flagellated bodies became circular and that the flagella were difficult to see—they had, in fact, disappeared. I need hardly say that these amœbæ, including bacillus coli, have long been known to have the property of protruding pseudopodia in the act of enveloping erythrocytes, &c., a few of which are generally to be found within their endosarcal protoplasm, as shown by the "two or three darker masses seen inside resembling nuclei." The highly refractile ectosarc, extraordinary motility, relatively large size, and the length of their pseudopodia, as compared with those of the bacillus coli, had they been observed, point clearly to their being the entamœba histolytica vel dysenteriæ of Schaudinn.

I would further point out the important fact that these amœbæ are practically extra-corporeal, as noted in my letter to the *British Medical Journal*, dated July 23rd last, and as shown in Dr. Hunt's case their intra-corporeal presence was merely accidental. Regarding the impossibility to detect such protozoa in specimens prepared by any of the ordinary stains, I have always found Romanowsky's stain very satisfactory in distinguishing this protozoon from the bacillus coli; the ectosarc of the latter stains less intensely than the endosarc, while in the entamœba dysenteriæ the ectosarc stains more intensely than the endosarc. There are, of course, many other means of differentiating between the two.

I am, Sirs, yours faithfully,

H. D. MCCULLOCH, M.B., C.M. Glasg.,
late Chief Medical Officer to H.H. the Nizam's State Railways Company.

Bournemouth, August 9th, 1906.

SALICYLATE OF SODIUM IN PUERPERAL FEVER.

To the Editors of THE LANCET.

SIRS,—I wish to draw attention to the value of salicylate of sodium in the treatment of puerperal fever. In spite of the utmost care on the part of accoucheurs in disinfecting their hands and instruments septic infection will result in a few cases from various causes, especially among those living in poor and overcrowded districts. A quick pulse with a rise of temperature is an indication of early and active interference, whether this is considered to be due to sepsis or not. A mercurial intra-uterine douche, to be continued twice daily if necessary, and the administration of 10 grains of salicylate of sodium every three hours should soon reduce both the temperature and the pulse. Should there be any depression quinine may be substituted later. I have seen such beneficial results from the use of salicylate of sodium both in puerperal fever and puerperal malarial fever when other remedies have failed that I have no hesitation in recommending it to be tried first of all drugs. Its action is that of an internal antiseptic and together with the local application of an antiseptic douche forms a rational mode of treatment in all cases of puerperal septicæmia. The drug is mentioned in obstetrical works but it does not appear to be used in practice so frequently as it deserves. Its early administration would save the employment of antistreptococcus serum.

I am, Sirs, yours faithfully,

Ealing, W., August 9th, 1906. EDWIN CHILL, M.D. Edin.

STUTTERING.

To the Editors of THE LANCET.

SIRS,—Your issue of July 14th has only just reached me and I crave your indulgence for space in your next issue. Dr. W. S. Colman in his admirable paper does not lay sufficient stress upon the difference between stammering and stuttering, an error commonly made. A stammerer does not know *how* to speak. A stutterer does not know *when* to speak. Stammering is caused frequently, as the author points out, by malformation of the organs of speech, their misuse, &c., whereas the organs in the case of stuttering are perfectly normal and its cause is often cerebral. If accompanied by facial and other muscular twitchings it is more difficult to cure. Medical treatment should go hand in hand with the educational treatment.

I am sure that all concerned in the subject must be grateful to Dr. Colman for having drawn attention to it, for unfortunately we have neglected too long the care and attention of proper articulation in our big public and elementary schools and I hope that very shortly a "Spracharzt" will be attached to all our large educational establishments. We shall have to find a word for the one I use (an importation from Germany), for which I think we have no equivalent as yet in our own language.

I am, Sirs, yours faithfully,

WILLIAM VAN PRAAGH.

Fitzroy-square, W., August 10th, 1906.

WHAT IS A SPECIALIST?

To the Editors of THE LANCET.

SIRS,—In THE LANCET of July 28th you published a letter with this title signed "A. Z." which appears to me to go insufficiently deep into the matter and to rather understate his case. Your note at the end emboldens me to come to his support, as I firmly and honestly believe you take a rather too charitable view of matters, though your view is the one which I myself held till I experienced what I will relate. I have become disillusioned and write with much bitterness of heart and complete and absolute distrust of all my fellowmen, particularly if belonging to the medical profession, with, of course, a few exceptions. Claiming your motto, "Audi alteram partem," as my justification, I ask you to put before your readers these views and estimations of my fellow men; they have been forced upon me by actual experience of a system of which I and scores of other men are the helpless victims. Incidentally the careers of men are altered by this system and, as "A. Z." puts it, "adversely and profoundly altered"; besides there is the question of helpless wives and children who suffer as the result of a want of organisation and straightforwardness in certain ranks of the medical profession.

A "specialist" as produced by our modern methods is necessarily, I maintain, for a certain number of years a fraud on his profession and the public. He is made a specialist of more or less practical ability by means of public funds subscribed for charitable purposes, the funds being more or less intrusted to the medical profession conjointly with a few lay persons. The only person who can be honestly called a specialist from the moment he starts in his specialism is one who has been working at his profession generally, but who, as the result of his work, has taken to a particular subject solely because he is proficient at it; he therefore can, and does, give real value in exchange for the money he demands. The other "specialist" (*sic*) is a person who hopes to become a specialist, who is ignorant of everything in general (not excepting his so-called "specialism") until such time as he has gleaned enough knowledge honestly to deserve to be suspected of "specialism." This person in the meanwhile practises as a "specialist," and not even yourselves can for a moment charitably pretend that the situation even savours of what ought to be. He is, as a rule, some young and lucky man, perhaps with a capacity for making himself agreeable, who has been selected by older men to fill vacancies on hospital staffs. He may even have been selected to keep out other more experienced men, and therefore more dangerous men from a competitive point of view.

Time and professional usages have marred the old ideal that the hospital staff exists for the dispensing of gratuitous

care to the poor; the necessity of holding a hospital appointment if a man is to get on is now generally recognised. A man must have a post, and if he be a youngster and inexperienced he must have material to gain experience upon. This is well and good, but let us look at the situation honestly. Incidentally, the material must be maintained, kept, and fed, and where better than in a hospital and at someone else's expense? Of course, when the rich man who has been paying falls ill he can have the benefit of the special knowledge by buying it at the "ring price." The above fully, though unpalatably, explains the "specialist" business and also his undue multiplication. As we are going, in a few years more there will be far more "specialists" than patients. If appointments are continuously filled by tyros to the exclusion of older and more experienced men the inevitable will happen. A crowd of competitors for public favour will undersell each other. Human nature is the same all the world over, in or out of the medical profession, and the results are the same—a few at the top will busily glean to the last straw, and all the large rest must tumble over one another to get a bare living. The danger to the public may be thought to be not worth considering by some of our colleagues when professional interests are at stake, but I hold that there are all the elements in this "specialist-hospital-system" for a merciless attack on the profession, absolutely unanswerable and overwhelmingly disastrous to the profession as a whole.

I am the last man to pretend that everyone in the higher ranks of the profession is moulded according to the foregoing picture; indeed, there are men in our ranks to associate with whom is an exhilarating moral and mental tonic. But the good and honest men are too few to leaven the mass below, (I am speaking exclusively of the so-called "specialist"). Two or three grand, noble men can do a great deal in a hospital staff for good; but in the long run it ends the same, as it always does when votes are counted, and here is where the evil shows itself ugliest. The brightest and grandest outlook, but for the constant drudgery and hard work, lies solely in the ranks of the general practitioner, who taking him all in all is the backbone of our calling. To emerge from his ranks and endeavour to enter the so-called higher grade is to take a plunge into a sorry cesspool of human weakness, and that this is so is due to our present system of hospital appointments. I write quite frankly as a disappointed and disgusted man, and I know that this fact must discount my words; none the less I am accurate.

The present system of advertising vacancies, which are not really vacancies in any sense of the term, is a fraud—it puts men to the expense of getting testimonials printed, causes them to worry their friends for these testimonials and wastes their time in calling on medical members of staffs (where one is sure to be told that no one cares a jot for testimonials). You could confer a great boon on your readers if you insisted on obtaining a guarantee that posts really were vacant, and would publish the guarantee along with the notification of vacancy. Why is this trick practised of advertising posts that will be given to selected men for certain, no outsides being wanted? Angry and disappointed candidates will say that it is done simply to fool the public and keep up the flow of money. Who is to contradict them? Calling on staffs in relation to vacancies is one of the most disagreeable things self-respecting members of an honourable profession can be asked to do, and when it is undergone to no purpose in support of a pretence it is loathsome. A man can apply for vacancy after vacancy and be passed over if he has not the reputation of being "a pleasant colleague to work with." All your readers will at once say that they are not surprised, but how many people stop to think what this may mean? The following true story will illustrate my point. I was asked to join a "money Zollverein" on a certain hospital of which I was a new member of the staff. On inquiring what it meant, I was coolly informed that all the members of the "Zollverein" were expected to send their private paying patients to one another for special forms of treatment! I declined to enter into such an arrangement and I was allowed to understand that if I did not I should not be a welcome colleague. Shortly after that, for other reasons, I resigned my post, and now the workers of the Zollverein are, I understand, busy informing members of our profession that they found me most unsatisfactory and quarrelsome to work with.

Candidates for appointments which are really vacant ought to be relieved of the necessity of soliciting the support of persons who do not want to see them. But I would go much further than this. I would place the staffing of the smaller or special London hospitals in the hands of a central body like the King Edward's Hospital Fund, which will look into the credentials of persons willing and desirous of becoming officers on hospitals and will allot a man as vacancies occur. If any man is so allotted, and he is not wanted by the particular hospital staff, let them object formally in writing, stating their grounds, and thus give the candidate the right to meet his accusers. You have invited correspondence and I accept your invitation.

I am, Sirs, yours faithfully,

August 8th, 1906. F.R.C.S. ENG., M.D.

MANCHESTER.

(FROM OUR OWN CORRESPONDENT.)

Post mortem Examinations.

A LETTER appeared in the *Manchester Guardian* about ten days ago narrating the proceedings that took place after the sudden death of a lady, the mother of the writer of the communication to the press. The lady died suddenly, at the age of 74 years, 11 days after her husband's death. The police were informed and police officers called at the house, asked many questions, and at 11.30 P.M. two of them came with orders to take the body to the public mortuary, where a post-mortem examination was made and the coffin was closed without any opportunity being given to the sons and daughters of seeing their mother's face again. So far as can be judged from the letter of complaint to the *Manchester Guardian* there were no suspicious circumstances connected with the death, and the verdict of the jury was "Death from natural causes." It is, of course, difficult to distinguish between cases where such proceedings are necessary and where they may be avoided with safety, but the feeling of the writer in question seems to be that too much is left to the policeman. It is possible that the police in giving their version of the case to the coroner are not always very discriminating, but it would not be well to be lax as to the safeguarding of human life, even if at times some pain is caused. With tact and good feeling it should not often be given.

Small-pox and Scarlet Fever.

Zymotic diseases still assert themselves in this district. At Oldham three householders were summoned the other day for having failed to notify the occurrence of infectious disease in their families. Perhaps the recent outbreak of small-pox has kept the authorities on the *qui vive*. Scarlet fever is prevalent at Hyde. A few days ago there were nearly 80 cases in hospital and the outbreak is described as "of a vicious type and difficult to stamp out."

A Town of Good Counsel.

Blackburn by its health committee gives good advice to its people, young and old. Posters have been displayed setting forth the dangers that alcohol, strong tea, and cigarette smoking bring in their train. "The children of drunken parents are frequently feeble from birth and inherit a direct tendency to many forms of physical and mental disease." The dirt and squalor of the drunkard's home, the children ill-fed, ill-taught, and neglected, his own life drifting from bad to worse, are all told in graphic language which, unfortunately, will be read only by the sober ones. Tea-drinkers are warned against "strong brew" and are told that tea should be freshly made and should only stand about two minutes. By the way, in some parts of the country this "strong brew" is further strengthened by a modicum of rum, tending, as the cronies consider, to good fellowship and the pleasure of drinking. Lastly, the evils of cigarette smoking and the inhalation of the smoke, especially by youths, are given as "potent causes of physical deterioration." Everyone will wish all success to the Blackburn experiment and will hope against hope that the sensible advice of the health committee will meet with the attention of those concerned and be followed by them, but the probability is that the posters will soon be forgotten and covered by others. The old slow method of example and personal influence, well exercised, will turn out to be the most efficient means of checking the mischief of the drink habit.

Ptomaine Poisoning.

An inquest held by the Manchester city coroner on August 9th illustrates the risks people run of ptomaine poisoning and the prevalent ignorance, spoken of already with almost wearisome iteration, as to the proper feeding of infants. A family ate some braised beef which had been bought from a confectioner. The father, mother, and children were all taken ill afterwards and the youngest child, 16 months old, who had, like the rest, eaten this braised beef, died. The confectioner had bought the beef from a butcher on the Thursday. It was cooked immediately and pressed the same evening. On the Saturday evening the last of it was sold to the unfortunate family who suffered so severely, and the confectioner had been told of eight other people who had been made ill. The butcher said that he bought the meat fresh on the Tuesday from the abattoirs, put it in brine, and sold it two days later. On the Saturday evening the beef was eaten, the whole family was ill on the Sunday, and on the Wednesday, in spite of treatment, the baby died. Dr. Scott, who attended them, said that the child died from ptomaine poisoning and that the "poison might exist in an article of food without being discoverable by ordinary individuals." These "cadaveric alkaloids" are of such frequent occurrence and so unsuspected that they should stimulate inquiry as to some method of detection.

Death Certificates.

The city coroner made some strong comments the other day about giving certificates of death. It seems that two students from St. Mary's Hospital attended a confinement and the newly born child died. They could not, of course, give a certificate and the mother's sister was told to go from person to person at the hospital and eventually, it is said, obtained a certificate signed by a medical man, "purporting that the person supplying it was present at the birth." The coroner said that, "as a matter of fact, the doctor was not present and had no business to supply the certificate." The jury gave a verdict of "Death from natural causes." In the absence of further explanation it must be allowed that the coroner was right in his remarks. Although a difficulty as to the death certificate may cause inconvenience to friends, from which a good-natured medical man will wish to relieve them, it does not justify him in going beyond the strict facts of the case and in giving an inaccurate certificate.

August 14th.

SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

Work in Scotland under the Inebriates Acts.

Dr. James C. Dunlop has just issued his report on the work done in Scotland under the Inebriates Acts. At the commencement of the year there were in Scotland six institutions licensed or certified for the treatment or reformation of inebriates. Of these one was a State reformatory, four were certified inebriate reformatories, and one was a licensed retreat. During the year no fresh certificates or licences have been granted, but all the above-mentioned six have continued. The number of persons being dealt with in these institutions, or temporarily absent from them at the commencement of the year, was 107; of these 27 were in a retreat, 47 were in certified inebriate reformatories, 12 were in the State inebriate reformatory, and 21 were temporarily absent from reformatories. Admissions during the year numbered 108, 63 being to a retreat, 36 to certified inebriate reformatories, and nine to the State inebriate reformatory. Discharges during the year numbered 102, of whom 62 were from a retreat, 31 from certified inebriate reformatories, and nine from the State inebriate reformatory. There were transfers from certified inebriate reformatories to the State inebriate reformatory. At the end of the year there were in all 113 persons being dealt with, of whom 28 were in a retreat, 56 were in certified inebriate reformatories, 16 were in the State inebriate reformatory, and 13 were temporarily absent from reformatories. The total number of persons dealt with during the year amounted to 215, of whom 100 were patients in a retreat, 18 were reformatory inmates sentenced under Section 23 of the 1898 Act, and 97 were reformatory inmates sentenced under Section 24 of that Act. As was the case last year, there is in Scotland only one retreat licensed in terms of the Habitual Drunkards Act, 1879, for the reception and treatment of voluntary patients. This retreat, Invernith Lodge, situated in the county of Fife and conducted by Mr. J. Q. Donald, has accommodation for the treatment of 30 inmates and is licensed for the detention of 22 cases admitted in terms of the 1879 Act. Dr. Dunlop states that he visited and inspected this retreat on several occasions during the year and was satisfied that the institution was being conducted in an exemplary manner. It is interesting to note that out of the 185 cases discharged since the opening of this institution it has been possible to trace the subsequent history in 142. Out of these 78, or 55 per cent., have by remaining free from the habit, given evidence of successful issue. To put it more exactly, 45 have been total abstainers for a period of at least a year, while 33 by being abstainers since discharge, though the period elapsed has not amounted to a year, may be considered as hopeful cases. Dr. Dunlop in his report points out that this retreat is only for persons of the moneyed classes, and that there is no licensed accommodation for the voluntary reception and treatment of male inebriates of the poorer classes, and none for the voluntary reception of female inebriates of either the moneyed or the poorer classes.

Appointment to the Chair of Physiology, Glasgow.

The King has been pleased, on the recommendation of the Secretary for Scotland, to appoint Dr. Diarmid Noel Paton, superintendent of the laboratory of the Royal College of Physicians of Edinburgh, to be Regius Professor of Physiology in the University of Glasgow, in place of Professor John Gray McKendrick, who has recently resigned. The new professor of physiology is the eldest son of the late Sir Noel Paton, R.S.A., and was born in 1859. He was educated at Edinburgh Academy and University and also at Vienna and Paris. He was Baxter scholar in natural science in 1882 and biological Fellow of the University of Edinburgh in 1884. He was appointed lecturer on physiology in the School of Medicine of the Royal Colleges, Edinburgh, in 1886, and three years later received the appointment which he will now vacate. He served on the Royal Commission on Salmon Fisheries in 1900. His numerous publications consist mainly of papers on physiological and fishery subjects.

Partick and Cerebro-spinal Meningitis.

At the monthly meeting of the Partick town council held this week Dr. G. A. Brown, medical officer of health, reported that during July four cases of cerebro-spinal meningitis were removed to the hospital. Of the four cases, three occurred in one family and all affected were children. At the next meeting a proposal is to be brought before the council to add this disease for a period of two years to the list of compulsorily notifiable diseases under the Infectious Disease (Notification) Act. As noted in THE LANCET, this measure has already been adopted by the health committee of Glasgow.

August 14th.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

University Education in Ireland.

MANY letters have appeared in the morning papers on this subject, especially with reference to the Royal Commission of inquiry which will meet in October. A section of the Roman Catholic laity has expressed its opinion that what is called the "Bonn University scheme" should be considered. It proposes that Trinity College should be reorganised and practically transformed into a mixed college for Protestant and Roman Catholic students. As might have been anticipated, Dr. Walsh, the Roman Catholic Archbishop of Dublin, has written that such a scheme was futile and would only uselessly delay the time occupied by the Commission of inquiry. In a subsequent letter the Archbishop stated that there is "no college within the University of Bonn and therefore there is no college there with two faculties of theology, Roman Catholic and Protestant, with two places of worship; therefore Bonn supplies no precedent for the adoption of the

scheme which for brevity was called the proposed Trinity College solution." To this Dr. Rudolf Imelman, Ph.D., who is a member of the teaching staff of the University of Bonn, has replied in a letter in which he states that there is theoretically nothing to prevent the establishment in his university of a college in Bonn where students could live together, Protestant and Roman Catholic. He says, moreover, that he does not follow the Archbishop in what seems to be his conclusion—that the absence of a college in Bonn would make it impossible to apply the Bonn system to the University of Dublin. The proposal really emanated from, and was signed by, 31 Fellows and professors of Trinity College as a scheme for consideration by the Royal Commission about to sit in October but in the light of subsequent events its consideration seems futile. When will Irish University education be settled to the satisfaction of rival religions? The matter is most serious for medical students in Ireland.

Purdysburn Fever Hospital.

On August 10th the Countess of Shaftesbury, at the central fire station, Belfast, named the new motor ambulance, one of two to be used to convey patients to the municipal fever hospital at Purdysburn, "The Shaftesbury." The ambulance is of interest as it is a motor one, with accommodation for two recumbent patients at one time and sitting accommodation inside for two other persons. The ambulance takes the form of a motor brougham, the chassis being 12–14 h.p., of the Cottereau make, fitted with Gaulois tyres, 815 × 100. It has three speeds forward and one reverse speed with ample brake power. At the ceremony the chairman of the public health committee took exception to the medical profession objecting to the location of the hospital at a distance from the city but the inconvenience and discomfort to which the patients would be subjected by being conveyed such a long distance are manifest. The very fact that the public health committee has been obliged to procure motor ambulances to make the transit as short as possible shows how absolutely right the medical profession were in objecting to an infectious diseases hospital being so far from the city. The new motor brougham ambulance takes 17 minutes to go from the central fire station (which is, roughly speaking, about the centre of Belfast) to the infectious diseases hospital, while from many distant parts of the city it will take twice as long a time. However, the essential point is that the hospital, which has been on the *tapis* for many years, will be ready for patients about the middle of September. It will be something to have such an institution at last in Belfast, so that to continue to carp at the site will be churlish.

Belfast District Lunatic Asylum.

At a meeting of the committee of management on August 14th it was decided to approve of the block plan for the villa colony at Purdysburn prepared by Mr. Hine, consulting architect, subject to such modifications as may from time to time be thought necessary, and that Mr. Hine with the local architects should be requested to state the rate of remuneration for plans, specifications, and quantities so as to enable the committee to estimate the approximate cost of the scheme and to decide what particular buildings shall be erected.

August 14th.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Malignant Growth of the Stomach; Gastrectomy.

AT a recent meeting of the Rouen Medical Society Dr. Bataille showed a specimen of the pylorus and contiguous half of the stomach presenting on the mucous surface a large circular growth, with thickened and indurated edges, in the centre of which was a deeply ulcerated depression. The growth was obviously malignant. The patient was a woman, aged 37 years, upon whom Dr. Bataille had operated eight years ago for appendicitis. For three months before the second operation she had lost all appetite, had vomited and grown steadily weaker. Through the abdominal walls in the epigastric region and to the right of the middle line there could be felt a hard but mobile mass of about the size of an orange. The mobility allowed the operation of gastrectomy to be possible. Some glands were found on both the greater and lesser curvatures. The tumour having been removed, Dr. Bataille sutured the duodenal end to the posterior wall of the stomach, the incision in which he closed by two rows of sutures, practising the operation known as *l'anastomose termino-latérale de Kocher*. In a fortnight the patient was convalescent and taking nourishment well.

The French Colonies and the Lunacy Law.

M. Margain and M. Decante have made an interesting report to the Medico-Legal Society of France upon the condition of lunatics in French colonies, the legislative and administrative measures taken in the mother country not being in force in the colonies, where much more arbitrary methods are employed. The number of lunatics in the colonies is relatively larger than it is in France, the most obvious causes being, in addition to the abuse of alcohol and hashish, the presence of many degenerates and persons ill-adapted in other ways to the struggle for existence and many individuals unfortunately influenced by the religious excitement of Mohammedan teaching. M. Margain and M. Decante urge that the same measures as are in force in France should be applied to the colonies, or, failing this, that special means should be devised for putting an end to a lamentable state of affairs. They point out that in Algeria there is no asylum and that the patients have to be transported to Aix or Marseilles.

Mental Confusion in the Course of Typhoid Fever and Scarlet Fever.

At the Sixteenth Congress of Alienists and Neurologists of France held at Lille from August 1st to 7th M. Taty and M. Chaumier gave an account of two cases of mental confusion originating in infectious disease. The patients were two young women, respectively aged 26 years. In the one case the febrile period lasted about a month. The patient showed signs of mental agitation and of abhorrence for food. Sero-diagnosis gave a positive reaction for typhoid fever and the patient recovered. In the second case the patient was an alcoholic. Her febrile period lasted some two months. The principal symptoms observed were mental confusion with stupor, abhorrence of food, albuminuria, a parotid abscess, and hæmaturia. The convalescence, during which the mental confusion improved, was hindered by febrile outbreaks due to the abscess. Sero-diagnosis gave a negative reaction as regards typhoid fever. Streptococci were found in the urine and staphylococci in the pus from the abscess. The patient had general desquamation, and apparently scarlet fever was the only infection to explain the morbid train of symptoms.

A New Method for obtaining Hæmatin Crystals for Medico-legal Use.

At a meeting of the Academy of Science held on July 30th M. Sarda and M. Coffart communicated a note about a new method of preparation of hæmatin crystals founded on a method described by M. Lecha-Marzo de Valladolid. The method consists in gently evaporating a portion of the suspected liquid upon a slide; then there are added successively one drop of chlorine water, one drop of pyridin, and one drop of ammonium sulphide. The cover-slide is then carefully applied and numerous crystals of chloro-hæmatin are obtained of a rhomboidal form of a deep reddish-brown or scarlet colour.

Loose Bodies in the Knee-joint.

At the summer meeting of the Medical Committee of the Bouches-du-Rhône M. Pons showed loose bodies from the knee-joints of a patient operated upon in the wards under the care of Professor Imbert. The patient was a man, aged 48 years, a miller. One month previously to his operation he suffered from a slight amount of fluid in his left knee-joint following on a fall. At the same time he noticed two moveable bodies in the joint which gave rise to acute pain when he walked. Professor Imbert extracted one of these bodies on May 4th. It was triangular and composed of bone mixed with cartilage. The other foreign body was fixed in the tendon of the patella where it gave the patient no further trouble. Some days later the patient perceived another loose body in the right knee. This was removed in the same fashion as the other and the patient went out of the hospital completely cured a few days later.

August 14th.

MEDICINE IN TORONTO.

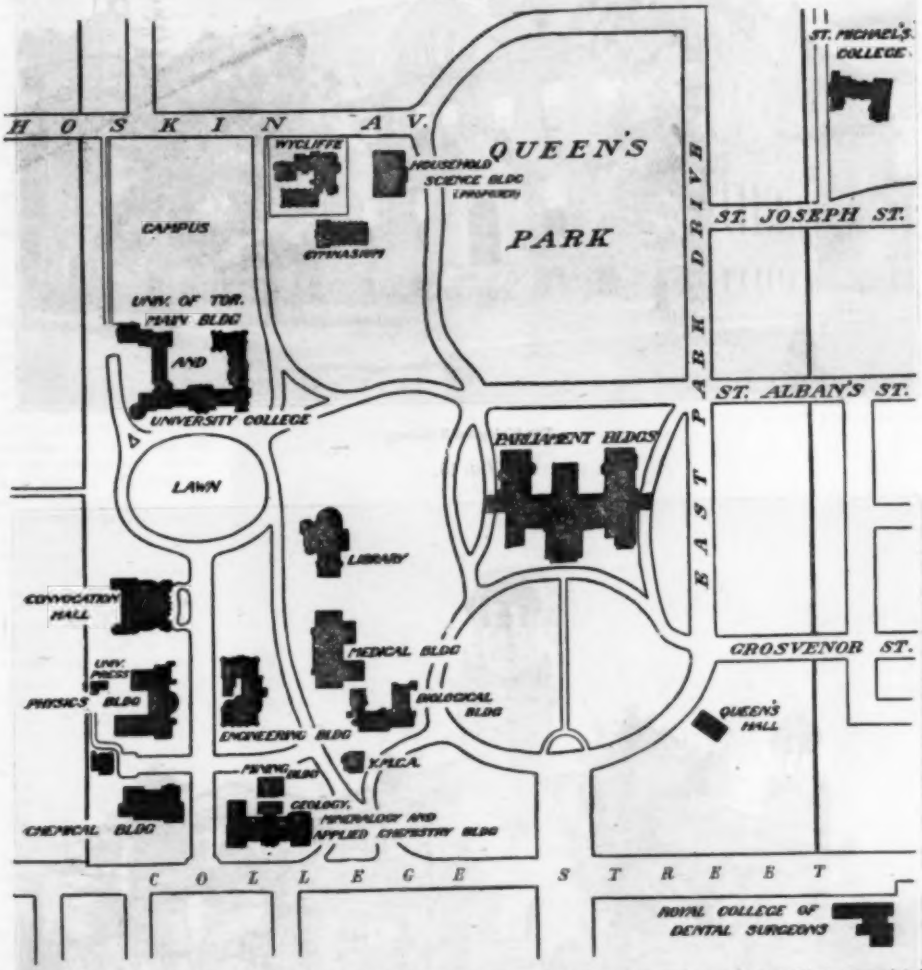
IV.[1]

THE DEVELOPMENT OF THE MEDICAL SCHOOL OF THE UNIVERSITY OF TORONTO AND ITS BUILDINGS.

IT has been shown how, after many checks and drawbacks, in 1887 the Medical Faculty of the University of Toronto came into smooth water. Since that time progress has been more or less uninterrupted. In the place of several medical schools, jealous of each other and so competing among themselves that a low standard of medical education prevailed, there is now one central medical faculty which has at its command the best medical talent of the province, as well as the use of buildings for the most part modern, adequate and well equipped for the study of medicine and surgery in their various branches.

The last phase of the fusing of the medical schools of Ontario took place in the summer of 1903, when Trinity Medical School was amalgamated with that of the University of Toronto, and the first inaugural address of the combined faculties was delivered on Oct. 1st, 1903, by Professor William Osler, now Regius Professor of Medicine in the University of Oxford, a Toronto man, and erstwhile a student at Trinity College, Toronto. The present professors in the medical school of the University of Toronto are as follows: Dean of the Faculty: R. A. Reeve, B.A., M.D., LL.D. Emeritus Professors: M. H. Aikins, B.A., M.D., W. W. Ogden, M.D., J. H. Richardson, M.D., and Uzziel Ogden, M.D. Professor and Director of the Anatomical Department: A. Primrose, M.B., C.M. Edin. Professors of Surgery and Clinical Surgery: I. H. Cameron, M.B. Tor., F.R.C.S. Eng., F. Le M. Grasset, M.B., C.M., F.R.C.S. Edin., G. A. Peters, M.B. Tor., F.R.C.S. Eng., and L. Teskey, M.D., C.M. Trin.

FIG. 13.

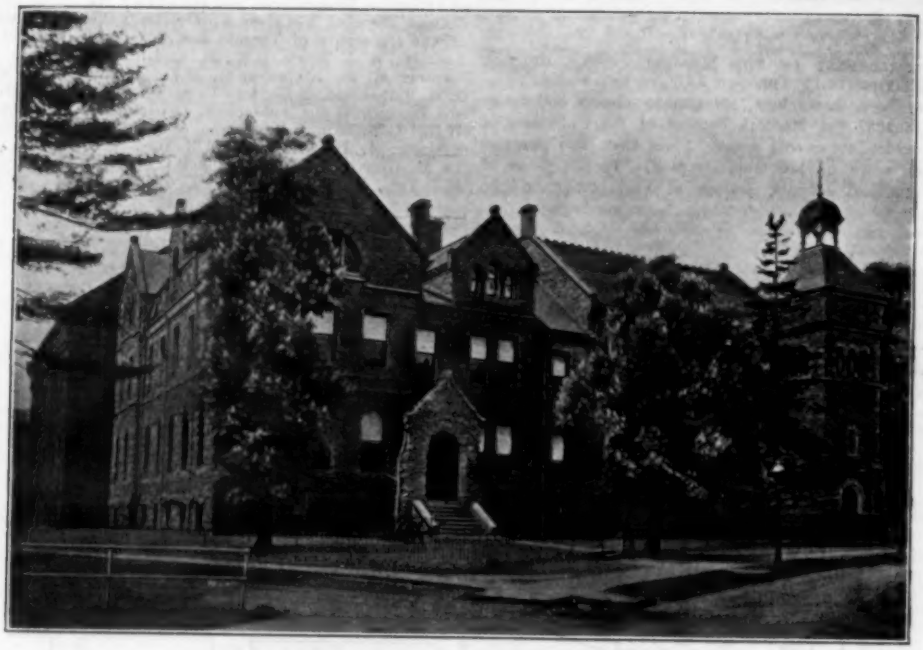


Plan of the University Buildings. The Physics Building is in course of erection, while the new Convocation Hall is just completed.

Professor of Pathology and Bacteriology and Curator of the Museum and Laboratories: J. J. MacKenzie, B.A., M.B. Tor. Professor of Medicine and Clinical Medicine: A. McPhedran, M.B. Tor. Professor of Clinical Medicine: J. L. Davison, B.A. Tor., M.D., C.M. Trin. Professor of Preventive Medicine: C. Sheard, M.D., C.M. Trin. Professor of Materia Medica and Therapeutics: J. M. MacCallum, B.A., M.B. Tor. Professor of Gynæcology and Operative Obstetrics: J. Algernon Temple, M.D., C.M. McGill. Professor of Obstetrics: A. H. Wright, B.A., M.B. Tor. Professor of Gynæcology: J. F. W. Ross, M.B. Tor. Professors of Ophthalmology and Otology: R. A. Reeve, B.A., M.B., LL.D. Tor., G. S. Ryerson, M.D.,

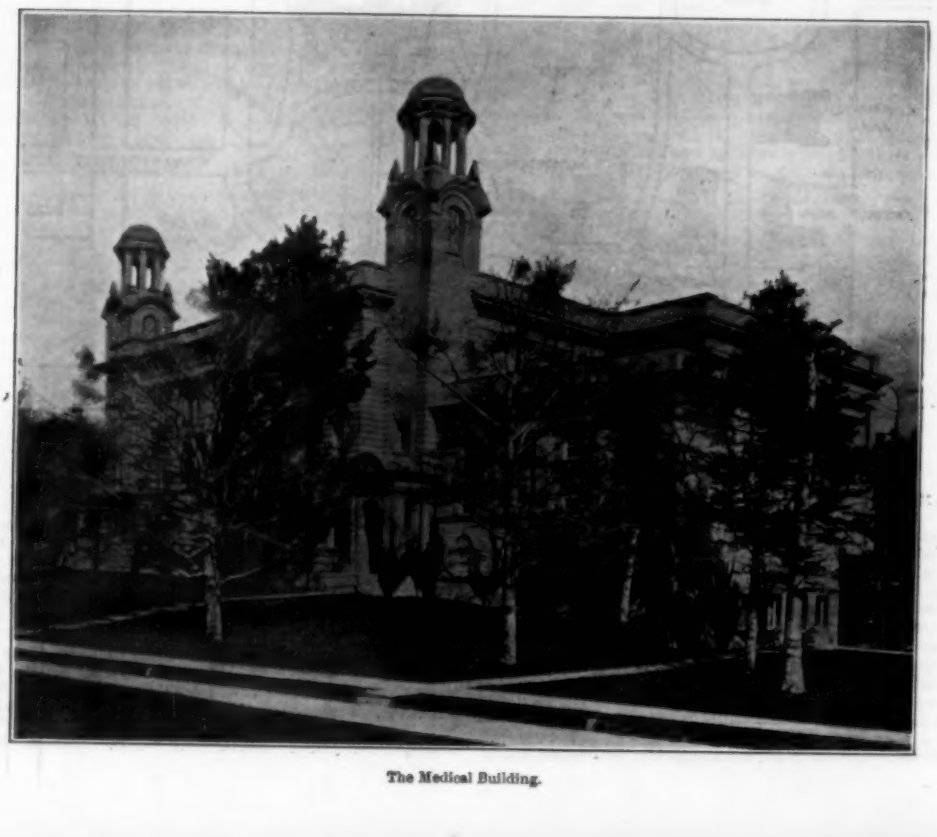
[1] Nos. I., II., and III. were published in THE LANCET of July 28th (p. 268) and August 4th (p. 331) and 11th (p. 405), 1906, respectively.

FIG. 14.



The Biological Building.

FIG. 15.



The Medical Building.

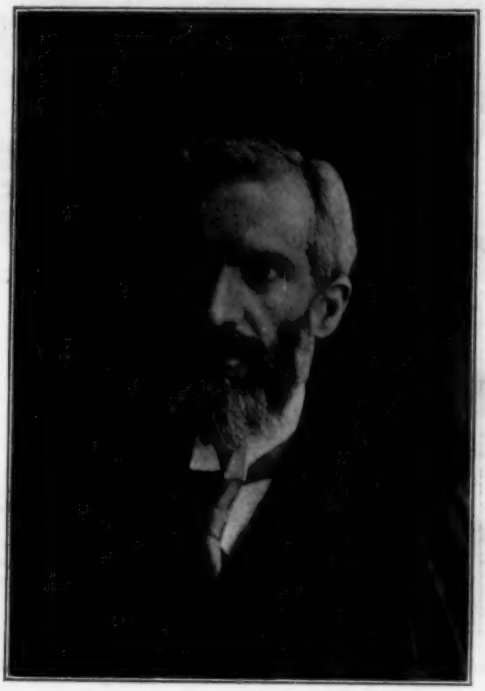
C.M. Trin., and G. H. Burnham, M.D. Tor., F.R.C.S. Edin. Professor of Laryngology and Rhinology: G. R. McDonagh, M.D. Tor. Professor of Hygiene: W. H. Ellis, M.A., M.B. Tor. Professor of Medical Jurisprudence: N. A. Powell, M.D., C.M. Trin., M.D. Bellevue, N.Y. Mental Diseases, Extra-Mural Professors: N. H. Beemer, M.B. Tor., and J. C. Mitchell, M.D., C.M. Trin. Professor of Biology: R. Ramsay Wright, M.A., B.Sc. Edin., LL.D. Tor. Professor of Physiology: A. B. Macallum, M.A., M.B. Tor., Ph.D. Johns Hopkins, F.R.S. Professor of Chemistry: W. R. Lang, D.Sc. Glasg. Professor of Physics: James London, M.A., LL.D. Tor.

The buildings in connexion with the Medical Faculty of the University of Toronto can be easily identified upon the subjoined plan, which we have extracted from the latest edition of the University Calendar. The plan omits Annesley Hall, Victoria College, and Knox College, the first two of which lie to the north of Queen's Park and the last some distance to the west. None of the three has any medical bearing whatever. Victoria College, the old Victoria University, now federated with the University of Toronto, is an arts college and is also a theological (Methodist) institution, and Annesley Hall is the women's college in connexion with it. Knox College is a theological college (Presbyterian). The plan (Fig. 13) shows well how the various buildings are grouped around the central building of the University, the University Library, and the Parliament Buildings of this province. The physical laboratory, established in 1878, is situated at present in the western part of the main university buildings and consists of a series of rooms for elementary work, together with a number of special laboratories. But within a short time all these laboratories will be removed to, and occupy, the New Physics Building now in course of erection and shown on the plan.

The psychological laboratory was established in 1892 and is situated in the west wing of the main university building. The laboratory is well equipped for investigations relating to psychophysics, psychological optics and acoustics, and time relations of mental phenomena. A small library is connected with the laboratory containing periodicals and special literature of experimental psychology. In 1896 the laboratory was enlarged by the addition of the rooms adjoining the ethnological museum and again in 1900 more rooms were added.

The biological building, a separate building, is formed of a central portion which contains the biological museum, and east and west wings, the latter of which is chiefly occupied by the anatomical department. The east wing contains the 12 rooms and laboratories of the biological department proper; on the ground floor is a large lecture room which will accommodate more than 250 students. There are also private rooms, a preparation room, departmental library, and a large laboratory for fourth-year students. Above the lecture room on the first floor is situated the elementary laboratory used for the practical instruction of the large classes of first-year students in arts and medicine, while the remainder is occupied by a lecture room for small classes, a laboratory for third-year students, a laboratory for vegetable physiology, and bacteriology and other rooms. The second floor contains two rooms for the preparation and storage of museum specimens, two for the accommodation of live animals, and also two hot-houses for use in connexion with the practical courses in botany. The biological museum occupies the entire central portion of the biological building. Its arrangement is such as to facilitate the most elementary as well as the most advanced studies. The museum is open to the public; its public entrance is approached from the west façade of the biological building. The student's entrance is in the eastern wing, in which the laboratories are situated. The interior of the museum occupies two floors, subdivided into four large rooms, amply lighted and well ventilated. Three of these rooms are devoted to animal biology and the fourth room, which is to be arranged later for the illustration of vegetable biology, is temporarily fitted up for the accommodation of the Ferrier collection of minerals. The north ground floor room, the south ground floor room, and the south first floor room are open to the public and serve the purpose of a well-equipped Natural History Museum.

FIG. 16.



Professor A. B. Macallum, F.R.S., Ph.D., Professor of Physiology in the University of Toronto.

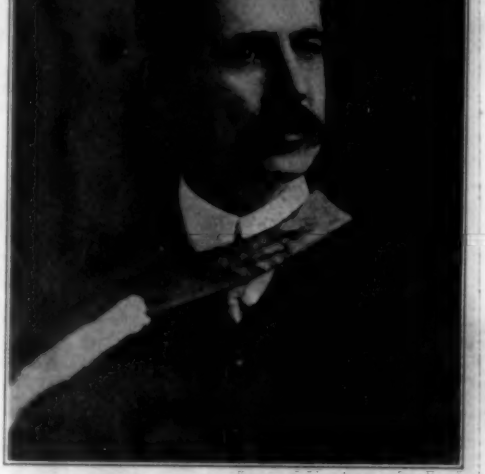
A serious fire some little time ago wreaked a considerable amount of damage in the buildings of the University, when the biological museum did not escape damage, but fortunately the injuries by fire did not involve the large collection of models and specimens most useful from an educational standpoint, which have been got together at the expense of much money and devoted labour. Private and public generosity has made good to a large extent the losses incurred, and the museum in its existing condition well fulfils the function of an additional source of biological instruction.

The chemical building was completed in 1895. The building comprises two lecture rooms with accommodation for 300 and 100 students respectively, special laboratories for all kinds of chemical analyses, and for the prosecution of original investigation generally.

For some time past the great increase of students had rendered it incumbent upon the University to provide better facilities for their accommodation and more modern and increased methods of instruction and it was formally recognised some five years ago that it would be necessary to provide new laboratories mainly for instruction in final subjects and for pathology and physiology. It was resolved accordingly to erect a building for this purpose in the University grounds. (Fig. 15.) This building, the medical building, was commenced in 1902 and formally opened in October, 1903. It represents a new departure in medical architecture and in consequence is worthy of a somewhat extended description. The buildings were the first to exemplify the unit system of laboratory construction proposed by Professor Minot of Harvard University, although here and there, in consequence of local conditions, it has not been possible to follow Professor Minot's ideals of construction exactly. The main features of this system were described by Professor A. B. Macallum in *Science* of May 22nd, 1903. The laboratory "unit" room must first of all be no larger than is required to accommodate readily the maximum number of students whose practical instruction a single demonstrator can efficiently guide and control. It must also be of such dimensions that it can at need be made to serve as a museum, a library or reading room,

or a small lecture room. The units, further, must be so placed with respect to one another, preferably in pairs or series, that by the removal of the partitions separating them rooms of larger dimensions may, when desired, be obtained at a minimum cost and in a short time. The dimensions of such a unit, as determined by Professor Minot, are 23 by 30 feet and this room will accommodate 24 working students, which number experience has shown is the largest that should be under the supervision of a single class demonstrator. Professor Macallum is of the opinion that the system offers the great advantage of elasticity, for a laboratory director may enlarge or contract at will, or according to the needs of the occasion, the accommodation required for a class. It has, he thinks, other and not less important advantages. The cost of construction is less than in any other system, it adequately provides for the all-important question of light, and it permits of subsequent extensions and additions without disturbance of the original arrangements. Professor Macallum also points out that the system provides for the formation of smaller rooms through the division of the unit. This building, which cost £25,000, is situated, as will be seen by reference to the plan (*Fig* 13), between the University library and the anatomical wing of the biological department. Externally the building presents a somewhat unusual appearance on account of the enormous window space. The window area is 242 square feet, while the outer wall of each unit measures 420 square feet. The window area is therefore almost three-fifths that of the outer wall. The building is three storeys in height in front, with an additional storey and sub-basement in the wings, which extend eastward. Two large lecture rooms are provided which flank the main building; the larger has accommodation for about 350 students, the smaller for about 200 students. In the south wing, in what may be called the basement storey, are situated caretaker's quarters, lavatories, recreation rooms, and reading rooms for the students; in a similar storey in the north wing is a large museum of hygiene. The south wing is occupied by the department of physiology and the main portion of the building and the north wing are used by those who are in the final stage of their medical student career. On the ground floor in the main portion are situated in front the dean's room, a large faculty room, a lavatory, and a library, behind which is placed a pathological museum. In the north wing on this floor behind the lecture theatre are a chart and preparation room, preparation and store rooms for the pathological museum, and laboratories for gross pathology. The second and third floors in the same wing and in front contain the laboratories of pathological histology and bacteriology, with rooms for the professor of pathology and demonstrators and "unit" rooms for small special classes. In the north wing on the third floor "units" are occupied by the Provincial Board of Health. The building is heated by air forced over heated coils by large fans driven by steam, and the ventilation is thus in part provided for and also by the exhaust currents in the ventilation turrets which rise over the entrance. A feature of special interest over and above that of the peculiar construction of the building is the provision of special research rooms. The Ethnological Museum is situated in the second storey of the main University building. A large portion of the ethnological collection was destroyed by the fire of 1890, but the museum contains all that was saved from the fire, together with additions which have been made since that time.

FIG. 17.



Dr. A. Primrose, Professor of Anatomy and Director of the Anatomical Department of the University of Toronto.

This has been necessarily a brief and incomplete story of the rise and organisation of medical education in Toronto. But our account does not claim to give more than the outline of all the numerous occurrences—the actions by distinguished individuals, the actions by corporate bodies, the actions by political persons—which have resulted in making of the medical faculty of the University of Toronto an ideally arranged institution for scientific teaching and research. The members of the British Medical Association who have journeyed to Canada will, many of them, still be present in Toronto when this issue of THE LANCET reaches the city. They will have received every facility from the University authorities for studying on the spot the equipment of the medical school, the laboratories, the museums, and all the other buildings to which we have made but passing allusions, and they will bear witness when they return home that we have not employed exaggerated phrases in placing Toronto before the readers of THE LANCET as an admirably appointed medical centre.

THE ANTI-MALARIAL CAMPAIGN IN ITALY IN 1905.

(FROM A ROMAN CORRESPONDENT.)

IN his report of the work done by the Society for the Study of Malaria during 1905, which has recently been published, Professor Celli has to record results from a greater number of stations in Italy than existed in previous years, especially in Southern Italy and in the islands. New and valuable contributions have also again been supplied during the past year by foreign associates. Here are some of the principal conclusions at which Professor Celli arrives after an obviously careful sifting of a good deal of material evidence.

A. Epidemiology.—The epidemic season of 1905 was in general exceptionally mild in the whole of Northern and in a great part of Central Italy. On the other hand, in Latium and Southern Italy (continental portion) it was, as a rule, severe, whilst in the islands it was not quite so severe as usual. A comparison of the incidence of malaria in the different European countries afflicted by it shows that Italy retains an unenviable pre eminence over all others, the disease being indeed of a graver type in some localities of Southern Italy than anywhere else on the face of the globe. The hæmatological researches prosecuted by some members of the society point to the conclusion that the various parasites in the different febrile forms do not constitute different species but are rather varieties of the same species.

No method has yet been discovered of diagnosing latent infection and recidivous cases, although it is pretty well established that recidivity is one of the chief causes which determine the annual and local variations of malarial epidemics; hence the importance of perfecting the preventive and curative treatment and especially of improving the methods of administering quinine to children. Again, the seasonal variations of epidemics seem to depend more upon biological properties inherent in the respective parasites than upon climatic conditions. Even in the warm climate of Southern Italy we find that anophelism and also rice culture may exist unaccompanied by malaria. It is interesting to learn that the larvæ of anopheles maculipennis in Algeria and of species very closely resembling it in the Dutch East Indies are capable of developing into the mature insect in sea water, even when the latter is concentrated. Should this turn out to be true of the anopheletes along the Italian coast all hope of eradicating malaria from the marshes by flooding them with sea water must be abandoned. The relations between malaria and meteorological conditions become more uncertain and obscure but the earthquakes in Calabria were undoubtedly a predisposing cause of this season's epidemic in that part of the peninsula.

As an instance of the connexion between malaria and certain industries it is noted that among the mining population of Sardinia the epidemic was more severe than among the agricultural population of the same district. Although an undoubted relation subsists between economic conditions and malaria this does not appear sufficient to explain why such terrible outbreaks should occur in Southern Italy and further researches are necessary to clear up the problem.

B. Prophylaxis.—The use of the State quinine goes on increasing in a remarkable way and is accompanied by a corresponding diminution in the mortality from malaria, as may be clearly seen from the subjoined table. An examination of the vital statistics of Italy from 1887 (when the causes of death first began carefully to be registered and analysed) until 1895 reveals an average annual mortality from malaria of over 15,000. From 1895 to 1901 the mortality fell to some extent with, however, the usual periodic recrudescence in 1900. From 1902, on the contrary, when State quinine was first introduced, the mortality diminished rapidly and progressively until in 1905 it reached the lowest figure hitherto attained—viz., 7838. The table also shows the net proceeds of the sale of the State quinine; these proceeds it is intended to apply to purposes having for their object the combating of the disease by prophylactic measures and works of bonification.

Table showing the Sale of State Quinine and the Mortality from Malaria.

Consumption of State quinine.		Mortality from malaria.		Net proceeds of the sale of State quinine.
Financial year.	Kilogrammes sold.	Year.	Total deaths.	
—	—	1895	16,474	—
—	—	1896	14,017	—
—	—	1897	11,947	—
—	—	1898	11,378	—
—	—	1899	10 811	—
—	—	1900	15,865	—
—	—	1901	13,561	—
1902-03	2,242	1902	9,903	34,270 lire.
1903-04	7 234	1903	8,513	183,038 ,,
1904-05	14,071	1904	8 501	183,382 ,,
1905-06	18,712	1905	7,838	230,000 ,,

The exhibition of the drug in the form of "chocolates of tannate of quinine," made by the State Quinine Factory, for rendering it more agreeable to take, especially for children, has proved of the greatest utility, the more so because of the slow rate of absorption of the tannate and its consequent suitability for the prevention of primitive and recidivous infections. For the rapid and radical cure of the "febbri recidive" no remedy has so far been found, the administration of quinine in daily doses of from one gramme to one and a half grammes for months consecutively, with and without arsenic, and by mouth or hypodermically, having failed to extirpate the infection in certain cases. Fortunately the effect of the prophylactic use of quinine for primitive infections is far otherwise. In the "campi dimostrativi" (experimental areas in malarial districts) reported upon by the members of the society, of 59,340 persons thus treated only 3458, or scarcely 5·8 per cent., were affected either by primitive or recidivous infections. The results naturally varied according to the locality and the number of recidivous cases; but even in Southern Italy, where the worst type prevails, the morbidity sank in the first year of the quinine prophylaxis from 35 to 80 down to 18 per cent. In the worst districts the daily dose of quinine should be 60 centigrammes (9 grains) to 80 centigrammes (12 grains), given in the form of bichlorate rather than of bisulphate; where a milder type of malaria prevails a daily dose of 20 centigrammes (3 grains) is sufficient; and where the fever is extremely light it is better to restrict the use of quinine to the inhabitants of houses where a case of primitive or recidivous infection has actually occurred. Mechanical prophylaxis continues to manifest its value. Mixed prophylaxis—i.e., a combination of mechanical protection against the anopheletes along with the use of quinine—is, however, now the rule along all the railway lines and is also being adopted largely for the protection of workers engaged in agricultural operations and industrial enterprises in the rural districts. As to exterminating the mosquito, the difficulty, or, rather, in Italy the impossibility, of accomplishing this becomes more than ever obvious.

It is encouraging to learn from this instructive report that, in localities where members of the Society for the Study of Malaria have been working steadily for the last three or four years, the peasants begin to show an eagerness to obtain quinine and, without any incitement being any longer necessary on the part of their medical men, to endeavour of their own accord to protect themselves against malarial infection.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

New Sanitary Regulations.

IN many parts of the country bakers are in the habit of wetting the dough before baking with a sort of broom made of straw or hay. Such straw brooms are likely to contain the germs of actinomyces, and some cases which have occurred make it probable that bread treated in this manner may be the means of transmitting such germs to man. The Minister of the Interior has therefore ordered a closer inspection of bakehouses in rural districts, and a warning has been issued against using brooms of that description for the purpose in question. If for any reason there is no substitute available, the brooms must be sterilised by boiling in water for half an hour and drying in the sun. Remembering the good effects of the leaflets distributed at the time of the epidemics of cerebro-spinal meningitis, the authorities have prepared and distributed in all the provincial bakehouses a similar leaflet describing the symptoms of actinomycosis and the methods of infection. The Minister of the Interior has also caused the regulations concerning the colouring and adulteration of food to be revised, and some colouring materials, such as the aniline dyes which modern chemistry can manufacture free from all admixture of arsenic or lead, will not henceforth be placed on the list of poisonous substances. The official list of colours and dye-stuffs regarded as poisonous now includes substances containing antimony, arsenic, picric acid, mercury, copper, chromium, and lead. Lead is sometimes employed by manufacturers of black silk and hosiery to increase the weight of the fabric, and this metal is frequently present in cosmetic lotions and preparations of that class. Such articles are now liable to be seized if they are intended for human use within the limits of the Austrian Empire.

The University of Vienna.

The medical faculty of the University of Vienna will in a short time lose four of its professors in consequence of the old regulations requiring that all professors and clinical teachers shall retire from their posts on reaching the age of 70 years. Of those who are therefore about to relinquish their chairs, Professor Adam Politzer is perhaps the best known. He will take advantage of the "bonification" permitted by the law, which entitles a professor to occupy his chair for one year more, the so-called "honorary year,"

after his seventieth birthday, and will accordingly during the session 1906–07 continue his celebrated courses on otology, which are conducted in the English language, if a sufficient number of his audience request it. The other teachers on the point of retiring are Professor Stoffella d'alta Rupe, who does not intend to apply for the honorary year, Professor Winternitz, and Professor Benedikt. Professor Winternitz is the Nestor of modern hydro-therapeutists and to him belongs much of the credit of having given hydrotherapy the position which it holds among modern means of treatment. Professor Benedikt is well known, even beyond German-speaking medical circles, for his investigations on the brain of mammals and for his treatise on the diseases of nerves. An original thinker, he has frequently denounced routine methods in the teaching of medicine and recommended a more individualistic system both in training students and in making appointments to medical posts.

Post-Graduate Study.

The summer term at the University closes at the end of July, but during August and September most of the assistants and several professors who remain in town will deliver post-graduate courses on certain selected subjects. The intention of these classes is to provide practical and theoretical instruction for practitioners who are desirous of keeping themselves informed as to the most recent advances in medicine and surgery, and the classes are naturally held at the time of year when these gentlemen can most easily be away from home. Operations on the abdomen and the genital organs, bacteriology, experimental pathology, and diagnosis are the leading features of the courses, whilst a number of other subjects, such as diphtheria, the use of mirrors, anomalies of refraction, &c., will be lectured upon if sufficient entries are obtained. The fees for such courses, lasting for four weeks, are usually from £2 2*s.* to £4 4*s.*, and practical work is facilitated by limiting the number of those admitted to the various classes.

The Annual Report of the Policlinic.

The Policlinic, like the General Hospital, is in various respects under the control of the medical faculty of the University. Its thirty-ninth report dealing with the events of the year 1905 has just been published and contains many interesting details. In 1905 there were 67,000 out-patients and 2247 in-patients, whereas in 1880 there were only 80 in-patients and 12,000 out-patients. During its existence 1,430,000 patients have been treated in both departments. In 1905 there were 119 children admitted to the diphtheria wards and 112 received serum injections. The diphtheria mortality was only 3·3 per cent., which is a great reduction as compared with the results obtained in former years. Previously to 1894 the diphtheria mortality was from 30 to 40 per cent. and the subsequent fall is a convincing proof of the efficacy of serum treatment. By the munificence of very high personages the institution has been able to obtain a considerable quantity of radium bromide, which has been employed chiefly in diseases of the skin and also in the treatment of mucous cancer. Among the in-patients the death-rate was 6 per cent. and among those operated upon it was 9½ per cent., children excluded.

A Series of 1000 Cases of Medullary Anæsthesia.

At a meeting of Croatian practitioners held recently in Vienna Dr. Schwarz read a very interesting paper on the results of 1000 injections of tropacocaine into the spine for surgical purposes. He has for the last four years employed the above-mentioned alkaloid, which gives him better results than either cocaine or stovaine. By very careful attention to the dose, which in no case exceeded 0·06 gramme (= 1 grain), and by taking the precaution of dissolving the alkaloid in ten cubic centimetres of the cerebro-spinal fluid of the patient, he never had a fatal result, and only in very exceptional cases were there any unpleasant after-effects such as nausea, headache, pyrexia, or collapse. The frequency of headache as an after-effect in the experience of previous observers has been explained on the ground that water, even when distilled, has a toxic action on the spinal and cerebral tissue. The modified process in which cerebro-spinal fluid is substituted for water as the solvent of the alkaloid is therefore a great improvement. If the operation was one requiring a long time for its performance Dr. Schwarz elevated the patient's pelvis so that a larger area of the spinal medulla was bathed in the solution. The place of injection was, as usual, between the fourth and fifth lumbar vertebræ. All kinds of operations on the lower half of the body below the umbilicus were performed under this analgesia, only in opening the abdomen the time of analgesia is limited to about one hour; the other parts of the body within the region specified, including the legs, perineum, bladder, and rectum, remain insensitive for two or three hours. Up to the present time about 3000 operations of this kind have been recorded without any fatal result due to the spinal injection.

August 11th.

Medical News.

UNIVERSITY OF LONDON.—At examinations held recently the following candidates satisfied the examiners:—

M.S. EXAMINATION.

Thomas Percy Legg, King's College and St. Bartholomew's Hospital; William Paynter Noall, Royal Infirmary, Manchester, and London Hospital; and William Gordon Taylor, B.Sc., Middlesex Hospital.

PRELIMINARY SCIENTIFIC EXAMINATION.

PART I.—INORGANIC CHEMISTRY, EXPERIMENTAL PHYSICS, AND BIOLOGY.

Inorganic Chemistry, Experimental Physics, and Biology.—Thomas Beaton, University College, Cardiff; Sydney Guy Billington, University of Birmingham; Gilbert Alan Blake, Guy's Hospital and University Tutorial College; George Francis Bradley, London Hospital; Gertrude Brooks, London (Royal Free Hospital) School of Medicine for Women; Joseph Henry Campain, University of Liverpool; John Warren Clouston, London Hospital; Gertrude Margaret Dobrashian, London (Royal Free Hospital) School of Medicine for Women; Robert Joel Cazalet Douty, Middlesex Hospital; Basil Franklin Eminson and Ralph Franklin Eminson, Epsom College; David Benjamin Evans, University College, Cardiff; James Maurice Foord, University of Leeds; Abdul Hamid Geol, Guy's Hospital; Alexander Keith Hamilton, University of Liverpool; Reginald Gordon Hill, St. Bartholomew's Hospital; Herbert Leslie Hopkins, Guy's Hospital; Charlotte Leighton Houlton, London (Royal Free Hospital) School of Medicine for Women; Charles Dones Killpack, Guy's Hospital; William Balfour Laird and Martin Wentworth Littlewood, St. Thomas's Hospital; Gerald Roche Lynch, St. Mary's Hospital; Roy Kyffin Mallam, Epsom College; Edith Marjorie Martland, Hulme Grammar School, Oldham; Henry Linnington Martyn, King's College School and private tuition; John Park Mathie, University of Glasgow; Ernest Spencer Miller, University of Liverpool; Stella Myers, Girton College, Cambridge, and London (Royal Free Hospital) School of Medicine for Women; Alfred Arthur Edmund Newth, Epsom College; Joan Fraser Parker, London (Royal Free Hospital) School of Medicine for Women; Sara Louisa Penny, University College, Bristol; James Potter, London Hospital; Thomas William Watkin Powell, Epsom College; Walter Woodall Pratt, University College, Bristol; Ffrangcon Roberts, Epsom College; Douglas Ross and Frederic Sanders, London Hospital; William Henry Price Saunders, Epsom College; Charles Frank Schuler, St. Thomas's Hospital; Emmanuel Prinsep Scott, London Hospital; F. R. Bradley Skrimshire, St. Thomas's Hospital; Geoffrey Troughton Smith, Alleyn's School, Dulwich, and Birkbeck College; Reginald Gershom Sparkes, St. Mary's Hospital; Mildred Blanche Stogdon, London (Royal Free Hospital) School of Medicine for Women; Richard Trevor Vivian, Epsom College; Harry Bertram Walker, London Hospital; George Edgar Septimus Ward, Epsom College; Harold Percy Warner, Guy's Hospital; and Roger Michael Wright, University College, Bristol.

Inorganic Chemistry and Experimental Physics.—*Richard Frank Bolt, University College, Bristol; Florence Hilda Bousfield, London (Royal Free Hospital) School of Medicine for Women; Andrew John Chillingworth, St. Bartholomew's Hospital; *Herbert William Cooke, University College, Bristol; Richard Stanley Dowell, University Tutorial College; *Thomas Peters Edwards, St. Bartholomew's Hospital; James Moncrieff Joly, Cheltenham College; Francis Harry Kelly, Middlesex Hospital; Joseph Howell Lloyd, private study; Ernest Mannering Morris, Whitgift School, Croydon; *Camilo Antonio Prada, St. Bartholomew's Hospital; Aneurin Evan Roberts, Towyn County School; Harold Rowntree, Middlesex Hospital; and *John Eric Wood, Hartley University College.

Inorganic Chemistry and Biology.—Albert James Clarke, St Bartholomew's Hospital; †John Henry Cobb, University of Sheffield; †James Anthony Delmege, Guy's Hospital; Walter Armstrong Elliott, University of St. Andrews; William Reginald FitzHugh, St. Thomas's Hospital; Stuart Leighton Heard, London Hospital; †Cyril George Hewett, University College; George Ashby Hooton, St. Bartholomew's Hospital; †Harold Arundel Moody, King's College; †Alexander George Hains Moore, Guy's Hospital; William Geoffrey Shaw, London Hospital; William Henry Vincent, St. Mary's Hospital; and Godfrey Alan Walker, Epsom College.

Experimental Physics and Biology.—Alured Charles L. O'S. Bilderbeck, St. Bartholomew's Hospital; Frederick Hyland Bowen, Victoria University and private study; Arthur Barrett Cardew, Epsom College; †Herbert Davies, Guy's Hospital, University Tutorial College, and Birkbeck College; Lionel Hugh Knightley Finch, University of Birmingham and Birmingham and Sutton Coldfield Technical Schools; Vincent Glendining, Guy's Hospital; Robert Hamer Hodges, King's College; Gerald Laurence, Epsom College; George FitzPatrick Rigden, King's College and Westminster Hospital; Francis Richard Todd, St. Bartholomew's Hospital; Victor David Collins Wakeford, Birkbeck College; and Harvey Henry Vincent Welch, St. Thomas's Hospital.

Inorganic Chemistry only.—*†Herbert Stuart Blackmore, University College; George James Bowen and *†Tudor David Bowen, University College, Cardiff; *†George Bent Buckley, Victoria University; *†Noel Hawley M. Burke, King's College; *†Alfred Bernard Clark, University of Sheffield; *†Wilfrid M. Glenister, St. Bartholomew's Hospital; Christopher Martin Ingoldby,

London Hospital; *‡W. H. Talfourd; Jones, Guy's Hospital; John Edward Kitchen, University of Leeds; *‡Geoffrey Marshall, University Tutorial College; *‡Victor Bwinge Negus, King's College; *‡Bernard Rayne Parmiter, University College, Nottingham; *‡Ernest Gerald Stanley, St. Bartholomew's Hospital; *‡James Simpson Strachan, private tuition; *‡Ernest Alfred Toser, London Hospital; *‡Arthur B. Guy Underwood, Birkbeck College; and *Samuel Wilson, Guy's Hospital.

Experimental Physics only.—Gordon Covell, Guy's Hospital; Israel Feldman, City of London School; George Barrowclough Horrocks, Victoria University; Maurice Mackenzie, London Hospital; Percy James Montgomery, Middlesex Hospital; Ralph Herbert Nankivell, Epsom College; *†Ambrose Owen, University College, Cardiff; Herbert T. Retallack-Moloney, City of London School; *Pestanji Manekji Masina, University College; Walter Salisbury, University College, Bristol; *Louis Bruce Stringer, Guy's Hospital; Aubrey William Venables, University Tutorial College; *†Bernard Thomas Verver, Guy's Hospital; and Emily Josephine H. Wallace, The Polytechnic and University Tutorial College.

Biology only.—Carlyle Aldis, Guy's Hospital; John Appleyard, University of Leeds; William Stuart Armitage, St. Mary's Hospital; †‡Margaret Mary Basden, London (Royal Free Hospital) School of Medicine for Women; †‡Cyril Carlyle Beatty, Durham College of Medicine and Armstrong College of Science; †‡Irene Nancy Clough, London (Royal Free Hospital) School of Medicine for Women; ‡Eric Crosby T. Clouston, University College and London Hospital; †‡Eliezer Coplans, University College; †‡Edward G. H. Cowen, Charing Cross Hospital and private study; Edwin Evans, University of Leeds; †‡Manchersha Dhanjibhai Durabji Gilder, University College, St. Xavier's College, and Grant Medical College, Bombay; Philip Withers Green, Epsom College; Frederick Wood Hamilton, Middlesex Hospital; Thomas Herbert Holroyd, University of Birmingham; †‡Augustine Henry Hudson University Tutorial College; Frank Cornwell Hunot, Guy's Hospital; Adolphus Pinto Leite, University College, Birkbeck College, and private study; Margaret Josephine McEnery, University Tutorial College, Birkbeck College, and private tuition; Dalton Mallam, London Hospital; †‡Hannah Grace Morland, London (Royal Free Hospital) School of Medicine for Women; Dosabai Rustomji C. Patell, University College; Cresswell Lee Pattison, St. Mary's Hospital; Francis Henry Balfour Percival, St. Bartholomew's Hospital and University Tutorial College; †‡Edward Gordon Reeve, Royal Albert Memorial College, Exeter, and Guy's Hospital; Theodore Essex Roberts, Guy's Hospital; Henry Ellis Robinson and Clement Kirwan Sylvester, St. Bartholomew's Hospital; †‡Alan Herapath Todd, Guy's Hospital; John Tremble, St. Bartholomew's Hospital; †‡Francis Silvanus Williams, University College, Cardiff; and †‡Mary Woods, Dublin School of Medicine.

* Already passed in biology.
† Already passed in inorganic chemistry.
‡ Already passed in experimental physics.

PART II.—ORGANIC CHEMISTRY.

John Wroth Adams, St. Bartholomew's Hospital; Francis Cooke Alton, St. Thomas's Hospital and Plymouth Technical Schools; Frederick Jasper Anderson, St. Bartholomew's Hospital; Richard William Annison, Middlesex Hospital; Kathleen Jane Armstrong, London (Royal Free Hospital) School of Medicine for Women; Edwin A. Attenborough, London Hospital; Richard Pitt Ballard, Guy's Hospital; Cyril Banks, University of Sheffield; Alfred David Eldred Bayliss and Joseph Dudley Benjafield, University College; Benjamin Bernstein, London Hospital; Claude Alexander Birts, University College; Kenneth C. Bomford, St. Bartholomew's Hospital; Kenneth J. C. Bradshaw, University of Liverpool; Basil William Brown, King's College and Birkbeck College; Hugh Leonard Burton, King's College and private tuition; Henry William Catto, Guy's Hospital; Alfred Ernest Dagnall Clark, St. Bartholomew's Hospital; William Edmund Crowther, University of Leeds; Hazel Haward Cuthbert, London (Royal Free Hospital) School of Medicine for Women; William Allen Daley, University of Liverpool; Frederick Adolph Dick and Geoffrey Dunderdale, Guy's Hospital; William Henry Dupré, St. Bartholomew's Hospital; Emile Marc A. Duvivier, Guy's Hospital; Arthur Oxley English, Middlesex Hospital; Robert Noel Farrer, University of Leeds; Frances Jane Preston, London (Royal Free Hospital) School of Medicine for Women; Harold Gardiner, Guy's Hospital; Thomas Woodcock George and Charles Gibson, London Hospital; Manchersha D. D. Gilder, University College and Grant Medical College, Bombay; Katherine Anne Gill, London (Royal Free Hospital) School of Medicine for Women; Charles D'Oyly Grange, University of Leeds; Alice Mary Ley Greaves, London (Royal Free Hospital) School of Medicine for Women; Douglas Green, University of Sheffield; Henry James Hacker, St. Bartholomew's Hospital; Arthur William Havard, University College, Cardiff; Guy Reginald Hind, Guy's Hospital; Gordon Victor Hobbs, St. Mary's Hospital; Harrie M. Hood-Barrs, London (Royal Free Hospital) School of Medicine for Women; Edward Leslie Horsburgh and Geoffrey Jefferson, Victoria University; Cecil Augustus Joll, B.Sc., University College, Bristol, and private study; Charles Douglas Kerr, St. Bartholomew's Hospital; Norman Claudius Lake, Plymouth Technical Schools; Peregrine S. B. Langton, Middlesex Hospital; Manly McWhinnie Lopez, University College Bristol; Mary Frances Lucas, London (Royal Free Hospital) School of Medicine for Women; Kenneth D. Marriner, St. Thomas's Hospital; Guy Matthews, King's College; George Maxted, Guy's Hospital; Bernard Constable Maybury, St. Thomas's Hospital; Mendel Mayers, London Hospital; James Menzies, St. Mary's Hospital; Adrian Leonard Moreton, St. Bartholomew's Hospital; Hannah Grace Morland, London (Royal Free Hospital) School of Medicine for Women; Richard Naunton O. Moynan, University College, Cardiff; Gerald Thomas Mullally, Guy's Hospital; Stella Myers, Girton College, Cambridge; George Edmund E. Nicholls, Victoria University; William Marshall Oakden, Nottingham High School; Henry Brice Parker, University College, Bristol; Willie Howarth Parkinson, Victoria University; William Henry Parr, London Hospital and University Tutorial College; Mary Minnie Patterson and Cicely May Peake, London (Royal Free Hospital) School of Medicine for Women; Edward Austen Penny, Guy's Hospital; Wilfred Langrish Pink, St. Thomas's Hospital; Harry Platt, Victoria University; Henry Martin Rashbrook, London Hospital; Morna Lloyd Rawlins and Maude Margaret Richards, London (Royal Free Hospital) School of Medicine for Women; Edward Hesketh Roberts, University College; Arthur Leyland Robinson, University of Liverpool; Cecil John Rogerson, University College; Richard Alun Rowlands, University College Bangor; Mary Schofield, London (Royal Free Hospital) School of Medicine for Women; Clement Edward Shattock, University College; Charles Woolley Shepherd, University College, Cardiff; Bernard Sangster Simmonds, Middlesex Hospital; Elliott John Storer, St. Bartholomew's Hospital; Robert Stout and Thomas Duncan M. Stout, Guy's Hospital; James Simpson Strachan, London Hospital and private tuition; Norman Tattersall, Victoria University; John Bailey Tackaberry, Middlesex Hospital; George Taylor, London Hospital; Leonard Herbert Taylor, Charing Cross Hospital and private study; Gottfried Oram Teichmann, Middlesex Hospital; Graham Yalden Thomson, Guy's Hospital and private tuition; Daniel Owen Twining and Edward Wing Twining, University College; Ernest White, St. Bartholomew's Hospital; Theodore H. Whittington, King's College; and William Wilson Woods, London Hospital.

N.B.—This list, published for the convenience of candidates, is issued subject to its approval by the Senate.

LONGEVITY.—Mrs. Isaac Needs of Brent Knoll celebrated the 100th anniversary of her birthday on July 6th, when she was the recipient of many congratulations.

THE ROYAL SANITARY INSTITUTE.—The forty-second course of lectures and demonstrations for sanitary officers will be held at the Parkes Museum, Margaret-street, Regent-street, London, W., during September, October, and November. The course is divided into two parts. Part I. comprises four lectures on elementary physics and chemistry and 21 lectures on public health statutes, the practical duties of a sanitary inspector, hygiene of communities, and building construction; inspections and demonstrations will also be arranged in connexion with the lectures and will include visits to disinfecting stations, dairy premises, common lodging-houses, refuse and sewage disposal works, and other public and private works illustrative of sanitary practice and administration. Part II. comprises seven lectures on meat and food inspection and practical demonstrations of meat inspection are given. The fee for Part I. is £2 12*s.* 6*d.*, for Part II. £1 1*s.*, or for the complete course £3 3*s.* The tenth course of practical training for meat inspectors will commence on Sept. 21st and will continue for two months. In addition to the practical training at a market the course will include seven lectures delivered at the Parkes Museum. The fee for the complete course will be £3 13*s.* 6*d.* A course of lectures on Hygiene in its Bearing on School Life will commence on Sept. 17th and will continue to Nov. 9th. It will consist of lectures and practical demonstrations on personal hygiene, school buildings, and school equipment. A fee of 5*s.* will be charged for the course. These lectures are intended to assist teachers and others interested in the training of children and the structural conditions of schools. Examinations on various subjects will be held by the institute in London on Dec. 7th, 8th, 14th, and 15th.

BOOKS, ETC., RECEIVED.

APPLETON, SIDNEY, London.

Modern Clinical Medicine. Diseases of Metabolism and of the Blood. Animal Parasites. Toxicology. Edited by Richard C. Cabot, M.D., Instructor in Clinical Medicine in the Medical School of Harvard University. An authorised translation from "Die Deutsche Klinik," under the general editorial supervision of Julius L. Salinger, M.D. Price 21*s.* net.

Diseases of the Nervous System resulting from Accident and Injury. By Pearce Bailey, A.M., M.D., Clinical Lecturer in Neurology, Columbia University, New York City; Consulting Neurologist to the Roosevelt, St. Luke's, and Manhattan State Hospitals, &c. Price 21*s.* net.

A Text book of Botany. For Secondary Schools. By John M. Coulter, A.M., Ph.D., Head of Department of Botany, the University of Chicago. Price 5*s.* net.

BAILLIÈRE, TINDALL, AND COX, 8, Henrietta-street, Covent-garden, London, W.C.

Applied Bacteriology. An Elementary Handbook for the Use of Students of Hygiene, Medical Officers of Health, and Analysts. Revised and edited by Cresacre G. Moor, M.A. Cantab., F.I.C., formerly Public Analyst for Exeter, and Senior Demonstrator in Public Health, King's College, London, with the coöperation of Richard Tanner Hewlett, M.D., F.R.C.P., D.P.H., Professor of Bacteriology, King's College, London, formerly Bacteriologist to the Lister Institute. Third edition. Price 12*s.* 6*d.* net.

Questions and Answers on Nursing for the St. John Ambulance Associations and Others. By John W. Martin, M.D., of Sheffield, Hon. Acting Medical Officer to the Jessop Hospital for Women, Sheffield; Examiner and Lecturer to the St. John Ambulance Association; Hon. Sec. to the Sheffield Centre. Fifth edition. Seventeenth thousand. Price 1*s.* 6*d.* net.

Aneurysm of the Abdominal Aorta. Being a Dissertation for the Degree of Doctor of Medicine in the University of Oxford. By Frederick Pitcairn Nunneley, D.M., M.A., Brasenose College. Price 3s. 6d. net.

BLAKELEY, E. H., 11, Adam-street, Strand, London, W.C.
Uterine Fibroids and other Pelvic Tumours. By Bedford Fenwick, M.D., Gynæcologist to the Hospital for Women, Soho square; formerly Senior Assistant Physician to the City of London Hospital for Diseases of the Chest. Price 3s. 6d.

CHURCHILL, J. AND A., 7, Great Marlborough-street, London, W.
A Manual of Midwifery. By Thomas Watts Eden, M.D., C.M. Edin., F.R.C.P. Lond., Assistant Obstetric Physician and Lecturer on Practical Midwifery, Charing Cross Hospital; Physician to Outpatients, Queen Charlotte's Lying-in Hospital; Physician to Inpatients, Chelsea Hospital for Women; Examiner in Midwifery and Diseases of Women at the Conjoint Board of the Royal Colleges of Physicians and Surgeons. Price 10s. 6d. net.
A System of Dental Surgery. By the late Sir John Tomes, F.R.S., Corresponding Member of the Philadelphia Academy of Natural Sciences; late Dental Surgeon to the Middlesex and Dental Hospitals. Fifth edition. Revised and enlarged by Charles S. Tomes, M.A., F.R.S., late Lecturer on Dental Anatomy and Physiology to the Royal Dental Hospital of London, and Walter S. Nowell, M.A. Oxon., Assistant Dental Surgeon, Middlesex Hospital. Price 15s. net.

Appointments.

Successful applicants for Vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BOOTH, LIONEL HETHORN, M.R.C.S. Eng., L.R.C.P. Lond., has been appointed House Surgeon at the Sunderland Infirmary.

HARRISON, JAMES MCKEAN, M.B., B.Ch., B.A.O. R.U.I., has been appointed Medical Officer to the Workhouse by the Ledbury (Herefordshire) Board of Guardians.

HOLLAND, EARDLEY L., M.B., B.S. Lond., F.R.C.S. Eng., has been appointed Assistant Resident Medical Officer to Queen Charlotte's Lying-in Hospital, London.

LYSTER, ROBERT ARTHUR, M.B., Ch.B., B.Sc. Lond., D.P.H., B.Sc., has been appointed Medical Officer of Health to the Urban District of Handsworth (Staffs.).

MORRISON, J. W. H., M.B., B.S. Durh., has been appointed Certifying Surgeon under the Factory and Workshop Act for Blaydon-on-Tyne District of the county of Durham.

SELLS, H. LANCELOT, M.B., Ch.B. Edin., has been appointed House Surgeon to the Hartlepools Hospital, Hartlepool.

TAGGART, WILLIAM JOHN, M.B., Ch.B. Edin., has been appointed Resident Medical Officer to the Victoria Hospital, Burnley.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

ABERDEEN CITY DISTRICT LUNACY BOARD, KINGSEAT LUNATIC ASYLUM.—Medical Superintendent. Salary £500 per annum, with house.

BRIGHTON, SUSSEX COUNTY HOSPITAL.—Third House Surgeon, unmarried. Salary £50 per annum, with board, residence, and washing.

BRIGHTON THROAT AND EAR HOSPITAL, Church-street, Queen's-road.—Non-resident House Surgeon for six months, renewable. Salary at rate of £75 per annum.

BUXTON, DEVONSHIRE HOSPITAL.—Assistant House Surgeon. Salary £70 per annum, with apartments, board, and laundry.

CARDIFF, ROYAL HAMADRYAD SEAMEN'S HOSPITAL.—Medical Superintendent. Salary £250 per annum, with residence, firing, and light.

CHESTER GENERAL INFIRMARY.—House Physician. Salary £80 per annum, with residence and maintenance.

CHESTERFIELD AND NORTH DERBYSHIRE HOSPITAL AND DISPENSARY.—Senior House Surgeon. Salary £120 per year, with board, apartments, and laundress.

COLCHESTER, ESSEX AND COLCHESTER GENERAL HOSPITAL.—House Surgeon. Salary £80 per annum, with board, washing, and residence.

COTFORD, TAUNTON, SOMERSET AND BATH ASYLUM.—Assistant Medical Officer, unmarried. Salary £140 per annum, with apartments, board, and attendance.

DORCHESTER, COUNTY ASYLUM.—Junior Assistant Medical Officer, unmarried. Salary £140, rising to £180, with board, lodging, &c.

DOVER, ROYAL VICTORIA HOSPITAL.—House Surgeon, unmarried. Salary £100 a year, with board and washing.

DUMFRIES AND GALLOWAY ROYAL INFIRMARY.—Assistant House Surgeon. Salary £25 per annum, with board and washing.

EAST LONDON HOSPITAL FOR CHILDREN AND DISPENSARY FOR WOMEN, Shadwell, E.—Medical Officer for the Casualty Department for six months, renewable. Salary at rate of £100 per annum, with luncheon.

EAST SUFFOLK AND IPSWICH HOSPITAL.—Third House Surgeon. Salary £50 per annum, with board, washing, and residence.

EGYPTIAN GOVERNMENT, MINISTRY OF EDUCATION.—Professor of Midwifery and Gynæcology. Salary £400 a year. Also Medical Tutor and Registrar to Kasr-el-Ainy Hospital. Salary £400 a year.

KIDDERMINSTER INFIRMARY AND CHILDREN'S HOSPITAL.—House Surgeon, unmarried. Salary £120, without board (or £80, with board).

KINGSTON-UPON-HULL, SANATORIUM AND EVAN FRASER (SMALL-POX) HOSPITAL.—Resident Medical Officer, unmarried. Salary £2 0 per annum, with residence, board, and washing.

LIVERPOOL, DAVID LEWIS NORTHERN HOSPITAL.—Two House Surgeons and a House Physician. Salary £60 each per annum, with residence and maintenance.

LIVERPOOL, ROYAL SOUTHERN HOSPITAL.—Three House Physicians and One House Surgeon. Salaries at rate of £80 per annum, with board and residence.

LONDON SCHOOL OF TROPICAL MEDICINE.—Cragg's Research Prize, value £50.

LONDONDERRY AND NORTH-WEST OF IRELAND EYE, EAR, AND THROAT HOSPITAL.—Honorary Surgeon.

MACCLESFIELD GENERAL INFIRMARY.—Junior House Surgeon. Salary £60 per annum, with board and residence.

MIDDLESEX HOSPITAL, W.—Second Assistant to the Director of the Bacteriological and Clinical Laboratories. Salary £100 per annum.

MOUNT VERNON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Hampstead and Northwood.—Resident Medical Officer. Honorarium £50 per annum, including board, lodging, &c.

NORTHAMPTON GENERAL HOSPITAL.—House Physician, unmarried. Salary £90 a year, increasing to £100, with apartments, board, washing, and attendance.

PORTSMOUTH BOROUGH ASYLUM.—Assistant Medical Officer, unmarried. Salary £120, rising to £150, with board, lodging, and washing.

PRESTON ROYAL INFIRMARY.—Resident Medical and Surgical Officer, unmarried. Salary £130, with board, residence, attendance, and washing.

ST. HELENS COUNTY BOROUGH.—Assistant Medical Officer (female). Salary £160 per annum, rising to £200.

ST. PETER'S HOSPITAL FOR STONE, &c., Henrietta-street, Covent Garden, W.C.—Junior House Surgeon for six months. Salary at rate of £50 a year, with board, lodging, and washing.

SALISBURY, FISHERTON ASYLUM.—Second Assistant Medical Officer, unmarried. Salary £120 per annum, with board, apartments, and washing.

SHIPSTON-ON-STOUR UNION.—Medical Officer for the Mickleton District. Salary £50 per annum and fees.

SOUTHAMPTON, ROYAL SOUTH HANTS AND SOUTHAMPTON HOSPITAL.—Junior House Surgeon. Salary £60 per annum, with rooms, board, and washing.

STAFFORDSHIRE COUNTY COUNCIL (Midwives Act, 1902).—Woman Inspector. Salary £120, rising to £150 per annum, with travelling expenses.

STOCKPORT INFIRMARY.—Junior Assistant House Surgeon for six months. Salary at rate of £40 per annum, with board, washing, and residence.

WARRINGTON UNION WORKHOUSE.—Resident Medical Officer, unmarried. Salary £130 per annum, with apartments, rations, and allowances.

WEST BROMWICH DISTRICT HOSPITAL.—Resident Assistant House Surgeon, unmarried. Salary £50 per annum, with board, residence, and washing.

YORK COUNTY HOSPITAL.—House Physician. Salary £100 per annum, with board, residence, and washing.

YORK DISPENSARY.—Resident Medical Officer, unmarried. Salary £120 a year, with board, lodging, and attendance.

Births, Marriages, and Deaths.

BIRTHS.

FLEMING.—On August 7th, at Chester-street, Edinburgh, the wife of Robert A. Fleming, M.D., F.R.C.P. Edin., of a son.

HEDLEY.—On August 14th, at 56, Hans-place, S.W., to Dr. and Mrs. Edward Hedley a son.

KENDALL.—On August 10th, at Chiddingfold, Surrey, the wife of Nicholas Fletcher Kendall, M.R.C.S., L.R.C.P., of a daughter.

SLADEN.—On August 7th, at Talbot-road, Highgate, the wife of Reginald J. Lambart Sladen, M.R.C.S., L.R.C.P., of a son.

WALES.—On August 14th, at Mevell Hall, Gargrave-in-Craven, the wife of Herbert Wales, M.A., M.B., B.C., of a son.

WICKHAM.—On August 9th at Willesborough, Ashford, Kent, the wife of Charles A. Wickham, M.R.C.S., L.R.C.P., of a daughter.

MARRIAGES.

BUCHANAN—HUDSPITH.—On August 11th, at the Church of the Holy Cross, Haltwhistle, Northumberland, Walter Isaac Buchanan, M.B., to Harriet Louisa, third daughter of the late County Alderman Hudspith, J.P., and Mrs. Hudspith, of Greencroft, Haltwhistle.

FRASER—JOHNSON.—On August 14th, at Hexham, Lachlan Fraser, M.D., of North Shields, to Annie, younger daughter of the late John Johnson, Cote House, Blanchland.

SCOTT—SECHERAU.—On August 8th, at St. Mary Abbots, Kensington, Lindley Scott, M.A., M.D., M.R.C.P., to the Baroness Gertrude von Schmidt Secherau, youngest daughter of Mrs. George Meakin of Creswell Hall, Stafford.

DEATH.

KALAPESI.—On July 16th, at Frere-road, Fort, Bombay, Dr. R. M. Kalapesi, M.B. Lond., D.T.M. Camb., M.R.C.S., &c., in his 37th year, of tuberculosis.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

TOUTING AGENCIES.

VARIOUS righteously indignant medical correspondents have forwarded to us the circular which we here reprint:—

THE EBOR EDUCATIONAL AGENCY, YORK.

August 9th, 1906.

DEAR SIR,—A friend of ours has handed your name to us and as we have many doctors in different parts of the country now acting for us we shall be pleased to know if you care to interest yourself in the following suggestion, which can be carried out without any additional trouble or expense to yourself. We are Agents for most of the best private schools in England, also several on the Continent. Our business is to introduce pupils to these schools and our desire is to use the best means possible to find pupils. All we wish you to do is when on your daily rounds to ascertain (in the ordinary course of conversation, without letting the parents think you are interested in the matter) whether they are likely to be sending their sons or daughters away to school and to forward their names to us, together with any other particulars you can give us. *That is all we require you to do.* Your name does not, *in any way*, transpire in the matter, unless in cases where you think it advisable. We then take the matter up and for every pupil we place at a school through your introduction we give you one guinea.

Yours truly,

THE SECRETARY.

The circular is in the usual style of the quack touting pamphlet. There is the unnamed friend who "has handed your name to us." There are also the unnamed "doctors in different parts of the country now acting for us." There is the bribe, in this case only one guinea, whereas in a recent application of the kind we quoted it was three. Modern developments of the commercial spirit reveal an uncomplimentary ignorance on the part of the advertisers as to the status of the medical profession. Sometimes the advertisement wishes the medical man to tout for cigars, sometimes for medicated wines, sometimes for quack medicines which purport to cure anything and everything, and the most disgusting feature of the matter is the habit that the proprietors of these wares have of asserting that they already keep members of the medical profession in their pay. We do not for one moment believe that the Ebor Educational Agency has any medical men acting for it; and the whole tone of the circular is such as to suggest that any parent who employed the agency with regard to the education of his child would be exceedingly foolish.

A QUESTION OF ETHICS.

To the Editors of THE LANCET.

SIRS,—Would you be kind enough to adjudicate on the following? A patient X sends for A to attend her. He does so and after a few weeks brings his partner B to see her. Later, the patient requests that C should be called in consultation. C's methods are such that A declines to meet him. A then says that he will meet any other practitioner she likes to suggest. Finally, she selects D who accordingly sees the patient with A. Some weeks later A is at out to take his holiday and informs the patient that his partner B will attend her. X then writes to say that she does not wish A to come any more and that she will send for another doctor. Her father approaches D who at first refuses. D is informed that if he does not attend C will be called in. D attends her, and writes to A saying that, when he was informed X desired C's attendance in case of his (D's) refusal, he reluctantly consented. He asked A's approval. A thanked D for his letter but stated that he strongly disapproved of him attending the patient after having seen her in consultation. D, however, continued to attend, and without any further communication to A. Was D justified in his action?

am, Sirs, yours faithfully,

August 11th, 1906. "A."

*** The situation has been discussed before—indeed, it is a sort of test point in medical ethics. We have in medical ethics to consider the public for whom the medical profession works, as well as the conditions under which that work can best be done. X, as a member of the public, has a right to the advice of whatever medical man she may choose, and no medical man can object to that right being exercised. X was therefore clearly at liberty not to employ A and to make overtures to D. But D was placed in a dilemma thereby. A medical man introduced to a patient by another medical man as a consultant should never, or almost never, continue in attendance on the case. The rule is for the public good. Medical men gladly afford their patients the advantages of consultation, but do so with the understanding that they will not be supplanted. In this instance D was informed that A would, at any rate, lose the patient, and so he considered himself free to attend her. The argument is a strong one, and if D had been a rival practitioner merely it would have been sufficiently strong. But D was, apparently, actually introduced to the patient by A, and should not, we think, have listened to any proposal whatever to take A's place without A's leave. But we cannot understand why A withheld his leave. He was, at any rate, to lose the case, and if D did not attend it the patient proposed to call in C, concerning whom A had taken a very extreme step. For it is most unusual for one medical man to refuse to meet another in consultation. The patient was within her rights to wish to see C, and A could only have denied C's aid to her upon some very good grounds. But if C's methods were likely to be dangerous to the patient while A was by her bedside, how much more dangerous would they be if C were in sole attendance. From that risk D seems to have saved her, and A should not resent it.—ED. L.

THE ACCIDENT ON HANDCROSS HILL.

THE inquest on the bodies of the persons killed in the accident due to the wrecking of a motor omnibus on Handcross Hill on July 12th came to an end on August 7th, when the jury found a verdict of "Accidental death." They also found that the accident was caused by a breakage of machinery brought on by the efforts of the driver to check the speed of the omnibus when he found that he was going too fast and considered that the driver committed an error of judgment in allowing the omnibus to go at too high a speed. They held no one criminally responsible but they were strongly of opinion that this type of omnibus was unsuitable for use on country roads. We think that this is a verdict with which nobody can quarrel, more especially with the last clause of it. Nearly all the motor omnibuses, which are seen about the streets now, have been brought into use while they are still really in an experimental stage, and many of them, owing to the noise, the vibration, and the evil-smelling fumes which they emit, are unfit for use on any road of any kind. Two statements made in evidence are worth notice. Mr. William Worby Beaumont, technical adviser to Scotland Yard, in answer to a question by Mr. Morse, who appeared for the Society of Motor Manufacturers and Traders, said that he considered that roads like that of Handcross Hill were extremely unsafe for the traffic of to-day and that there was no excuse for leaving a road in such a state. Mr. Reginald William James, consulting engineer, gave it in his evidence that in his opinion for journeys in country districts where declivities were sharp, emergency brakes entirely independent of the transmission gear were a proper provision for the safety of the passengers. With regard to Mr. Beaumont's evidence, most country roads, in the southern counties at all events, in dry weather are loose and awkward for traffic. We do not think that authorities can be expected to provide roads for the modern motor omnibus, at any rate, for that type of it which is presumably constructed for town use, and is admittedly only constructed in an experimental manner. As to brakes entirely independent of transmission gear, these, to our minds, should be made compulsory upon every description of mechanically propelled vehicle.

MEDICAL ATTENDANCE ON MEDICAL STUDENTS.

To the Editors of THE LANCET.

SIRS,—Could you give me any information on the subject of fees charged to medical students for professional attendance by qualified medical practitioners? On several occasions when staying in various parts of England I have had to call in a medical man, and although I always ask for the bill to be sent in (as a matter of form as I have now come to consider it), I have never come across any medical man who would allow me to pay him for his services. I know, however, of more than one student who has been charged for professional attendance, and I conclude from this that the question of charging or not is one that each practitioner settles for himself.

I should be very glad if you could tell me if medical students have any *right*, in virtue of their calling, to free medical attendance, or whether it is a case of good nature on the part of most medical practitioners. I inclose my card and remain,

Yours faithfully,

August 11th, 1906. MEDICAL STUDENT.

*** No one, medical practitioner or medical student alike, has any legal or unassailable right to gratuitous medical advice. Medical men, as a matter of fact, always do treat without charge other medical men and their families, and some medical men extend the privilege to medical students. This is a matter for the individual discretion of the medical man, but the pecuniary circumstances of the student, or his relations to the medical man, generally determine the course to be pursued. There is no reason why a medical practitioner should not charge a medical student, being in a good pecuniary position and a stranger, fees for professional assistance; but no medical man would accept fees from a medical student if the student was in poor circumstances, or was known to him personally, or was a pupil of the same medical school.—ED. L.

HIGH-POWER MICROSCOPY.

IN THE LANCET of July 11th, 1903, p. 116, we described the principal features of the microscope devised by Dr. Siedentopf in which "ultra-microscopical" particles of gold disseminated through ruby glass are rendered visible. The magnifying lenses are similar to those employed in ordinary high-power work; the peculiar effects which have led to the instrument being called the ultra-microscope are due to the illumination of the object by an intense beam of light directed at right angles to the axis of the optical system. No details of form or structure can, however, be made out in this way, the objects appearing merely as brilliant points seen against a dark background.

The *Scientific American Supplement* of August 4th contains a long article with several illustrations giving an account of observations made in this way and published in Germany by Siedentopf and Zsigmondy. For the unit of measurement applicable to such infinitesimal magnitudes they employ the symbol $\mu\mu$ to denote the one-thousandth part of μ or (which is the same thing) the one-millionth part of a millimetre. The ultra-microscope may be applied to the study of colloidal solutions, such as solutions of albumin, glycogen, the colloidal metals, and many dye stuffs. Even to the naked eye these solutions do not appear so clear and transparent as solutions of crystallised substances, and a cone of light projected into them by a lens is brightly luminous. Colloidal solutions of gold under the ultra-microscope present an appearance similar to that of ruby glass except that the innumerable bright spots in the solution have very rapid proper motions both of oscillation and of translation, resembling the Brownian movement well known to all microscopists. Attempts made to estimate the size of the particles had the result that the smallest value found for the average thickness of particle was 6 $\mu\mu$ (about 1/4,000,000th inch) and the largest was 40 $\mu\mu$ (about 1/600,000th inch). When a very weak albuminoid solution, such as diluted blood serum, is examined with the ultra-microscope the field appears strewn with very fine moving points of light. Solutions of glycogen also show numerous particles, but when a sugar-forming enzyme (saliva) is added the particles gradually disappear as saccharification progresses.

DISEASE IN THE BRIDE'S CAKE.

To the Editors of THE LANCET.

SIRS,—The well-intentioned letter of Dr. A. S. Morton in your issue of August 11th conveys the impression that the method of icing and ornamenting bride's cakes and ornamental pastry is done by blowing icing and other sweet-stuffs upon them by means of tubes applied to the lips of the pastrycook. The method by which brides' cakes are iced is by applying a coating of icing to them by means of a palette knife, so that there is no necessity at all for any fear regarding the cleanliness and propriety of the operation. The lighter ornamental work is applied by means of icing tubes from which the threads of icing are expelled by the pressure of the right hand upon the bag which contains the icing. The practice to which the writer of the letter alludes is that occasionally the aperture of the pipe becomes stopped either with the icing drying or with little pieces of dried sugar. Careless and dirty workmen remove these obstructions by applyin the tubes to their mouths, and in a similar way they cut the thread of the icing when it comes too quickly out of the bag and prevents them tracing accurately the design which they intend to follow. The former difficulty can be removed by means of a pin or a clean nail, and the latter by drawing the pipe across the edge of their icing bowls. There are very few confectioners now who follow the old custom to which your correspondent draws attention, and which is severely condemned—as it ought properly to be—by all who have the reputation of the trade at heart.

Yours sincerely,

THE EDITOR OF THE "BRITISH BAKER."

Shoe-lane, E.C., August 15th, 1906.

To the Editors of THE LANCET.

SIRS,—The risks in this connexion are far more serious and the practices more disgusting than your correspondent's letter indicates. I have watched experts in sugar icing at an annual prize competition in London with the general public looking on and a number (I think I may safely say the majority) of the competitors were constantly sucking the small end of the cone from which the icing was being squeezed; this is not subsequently heated to any extent. Particularly I watched one who appeared to do this mechanically every few seconds; the act of placing the end between the lips and removing it was, of course, performed with great rapidity. Comment is needless, but one may well ask what occurs under ordinary conditions if this is the practice in public. I am, Sirs, yours faithfully,

August 11th, 1906. A. S.

MOTOR CYCLES.

To the Editors of THE LANCET.

SIRS,—Will you kindly inform me as soon as possible in your column for "Answers to Correspondents" whether or not the employment of the motor cycle is attended with undue strain (especially on the heart), brought about by the starting of the motor cycle? Two cases of such injury to health have been reported to me in vigorous young men of athletic build. I am, Sirs, yours faithfully,

August 11th, 1906. A LATE HEALTH OFFICER.

*** We have had an instance brought to our notice where cardiac discomfort had been experienced after riding a motor cycle, and the vibration has been known to cause deafness.—ED. L.

A SEASIDE HOLIDAY COMPANION.

OUR readers may remember the *Home University* which a few years ago was issued by the Haslemere Museum authorities, principally, we believe, for the use of past students of high-class schools. We have received from the curator of Haslemere Museum a copy of the *Museum Gazette* for July, a publication which seems to be conducted on similar lines to that of the *Home University*. The editor is Mr. Jonathan Hutchinson, F.R.S., and the magazine contains several interesting articles on subjects connected with natural history. The principal feature is "Seaside Natural History" illustrated with seven plates. The pictures of objects to be found on the sea shore are admirably reproduced and should prove useful to the many parents who, having forgotten the marine botany and zoology which they learnt in their young days, are puzzled by the questions of their children when spending a summer holiday at the seaside. The price of the gazette is 6d. and the London agents are Messrs. John Bale, Sons, and Danielsson, 83-91, Titchfield-street, Oxford-street, W.

MOTOR-CARS FOR MEDICAL MEN.

To the Editors of THE LANCET.

SIRS,—In view of the proposal of the Royal Commission on Motor-cars that the taxation should be on a graduated scale according to weight, the Committee of Medical Men using Motors will meet in October to consider what steps should be taken to watch the interests of the members of our profession. The weight of the high-powered racing car is often very much less than the touring car such as is used by the country practitioner, and when the medical man's car is fitted with some protection from the weather it will in almost every instance weigh over 25 hundredweights. Eight guineas a year may be a very small matter to the owner of a racing car but it will press very heavily on the "country doctor." I should be much obliged if medical men owning cars will send me a line giving the weight of their car when "ready for the road." These replies will be of great value to my committee and will give a guide as to the effect of this tax on the profession. I am, Sirs, ours faithfully,

H. E. BRUCE PORTER, Honorary Secretary.

6, Grosvenor-street, W., August 9th, 1906.

TINNED ANCHOVIES CONDEMNED.

AT North London recently Mr. Cluer ordered to be destroyed, on the application of an inspector to the Hackney borough council, 30 cases, each containing four 20 pound tins of anchovies. The provision merchants who had called the attention of the inspector to the bulged condition of the tins which had been consigned to them were exonerated from blame, but it was stated that the public health committee of the council would consider the question of proceeding against the wholesale firm which had originally sent the anchovies to be sold for human food. The quantity mentioned is a large one, and the case is of importance when it is considered how widely 2400 pounds of anchovies would be likely to be distributed.

POST-GRADUATE INSTRUCTION IN PRACTICAL SURGERY.

To the Editors of THE LANCET.

SIRS,—Practising in the distant provinces I find it indispensable to undertake serious operations occasionally. How can I obtain the requisite training? Classes in practical surgery, as conducted in the great teaching centres, are ludicrously inadequate. I cannot well take a house-surgeoncy even if I could get it. Are there post-graduate practical surgical classes?

I am, Sirs, yours faithfully,

August 8th, 1906. A COUNTRY SURGEON.

*** See Students' Number of THE LANCET, Sept. 2nd, 1905, p. 729.—ED. L.

HARVEST BUGS.

To the Editors of THE LANCET.

SIRS,—As a child I suffered far more than the rest of us from harvest bugs. My father (consulting surgeon at Westminster Hospital) tried several drugs, but Goulard's extract, 10 minims to one ounce of distilled water, allayed the irritation very soon if one had patience to keep still. I am, Sirs, yours faithfully,

August 11th, 1906. HARVEST.

M. A. K.—The first book mentioned by our correspondent, which is in two volumes, will shortly be reviewed. The second book was reviewed in THE LANCET of Nov. 10th, 1900, p. 1355.

Messrs. Feuerheerd Bros. and Co., Limited, of 47, Mark-lane, London, E.C., point out to us that the analytical notice headed "Grape Port" in our issue of August 4th, p. 304, should have been headed "Three Grape Port." As these two descriptions belong to two different wines of this firm the correction is of some importance.

COMMUNICATIONS not noticed in our present issue will receive attention our next.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, August 16th, 1906.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radiation in Vacuo	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Aug. 10	29·79	W.	...	120	74	61	59	63	Cloudy
,, 11	29·74	W.	0·01	125	74	57	59	64	Cloudy
,, 12	29·85	S.W.	...	96	72	59	64	68	Overcast
,, 13	29·65	S.	...	116	78	61	65	71	Cloudy
,, 14	29·66	S.W.	0·05	102	71	60	60	63	Cloudy
,, 15	29·75	W.	...	117	70	58	59	64	Cloudy
,, 16	29·84	W.	0·08	121	69	55	56	60	Fine

Medical Diary for the ensuing Week.

OPERATIONS.

METROPOLITAN HOSPITALS.

MONDAY (20th).—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), St. George's (2 P.M.), St. Mary's (2.30 P.M.), Middlesex (1.30 P.M.), Westminster (2 P.M.), Chelsea (2 P.M.), Samaritan (Gynæcological, by Physicians, 2 P.M.), Soho-square (2 P.M.), City Orthopædic (4 P.M.), Gt. Northern Central (2.30 P.M.), West London (2.30 P.M.), London Throat (9.30 A.M.), Royal Free (2 P.M.), Guy's (1.30 P.M.), Royal Ear (2 P.M.), Children, Gt. Ormond-street (3 P.M.).

TUESDAY (21st).—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), Guy's (1.30 P.M.), Middlesex (1.30 P.M.), Westminster (2 P.M.), West London (2.30 P.M.), University College (2 P.M.), St. George's (1 P.M.), St. Mary's (1 P.M.), St. Mark's (2.30 P.M.), Cancer (2 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square (9.30 A.M.), Soho-square (2 P.M.), Chelsea (2 P.M.), Central London Throat and Ear (2 P.M.), Children, Gt. Ormond-street (2 P.M., Ophthalmic, 2.15 P.M.).

WEDNESDAY (22nd).—St. Bartholomew's (1.30 P.M.), University College (2 P.M.), Royal Free (2 P.M.), Middlesex (1.30 P.M.), Charing Cross (3 P.M.), St. Thomas's (2 P.M.), London (2 P.M.), King's College (2 P.M.), St. George's (Ophthalmic, 1 P.M.), St. Mary's (2 P.M.), National Orthopædic (10 A.M.), St. Peter's (2 P.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Gt. Northern Central (2.30 P.M.), Westminster (2 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Cancer (2 P.M.), Throat, Golden-square (9.30 A.M.), Guy's (1.30 P.M.), Royal Ear (2 P.M.), Royal Orthopædic (3 P.M.), Children, Gt. Ormond-street (9.30 A.M., Dental, 2 P.M.).

THURSDAY (23rd).—St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), University College (2 P.M.), Charing Cross (3 P.M.), St. George's (1 P.M.), London (2 P.M.), King's College (2 P.M.), Middlesex (1.30 P.M.), St. Mary's (2.30 P.M.), Soho-square (2 P.M.), North-West London (2 P.M.), Gt. Northern Central (Gynæcological, 2.30 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square (9.30 A.M.), Guy's (1.30 P.M.), Royal Orthopædic (9 A.M.), Royal Ear (2 P.M.), Children, Gt. Ormond-street (2.30 P.M.).

FRIDAY (24th).—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), Guy's (1.30 P.M.), Middlesex (1.30 P.M.), Charing Cross (3 P.M.), St. George's (1 P.M.), King's College (2 P.M.), St. Mary's (2 P.M.), Ophthalmic (10 A.M.), Cancer (2 P.M.), Chelsea (2 P.M.), Gt. Northern Central (2.30 P.M.), West London (2.30 P.M.), London Throat (9.30 A.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square (9.30 A.M.), City Orthopædic (2.30 P.M.), Soho-square (2 P.M.), Central London Throat and Ear (2 P.M.), Children, Gt. Ormond-street (9 A.M., Aural, 2 P.M.), St. Mark's (2.30 P.M.).

SATURDAY (25th).—Royal Free (9 A.M.), London (2 P.M.), Middlesex (1.30 P.M.), St. Thomas's (2 P.M.), University College (9.15 A.M.), Charing Cross (2 P.M.), St. George's (1 P.M.), St. Mary's (10 P.M.), Throat, Golden-square (9.30 A.M.), Guy's (1.30 P.M.), Children, Gt. Ormond-street (9.30 A.M.).

At the Royal Eye Hospital (2 P.M.), the Royal London Ophthalmic (10 A.M.), the Royal Westminster Ophthalmic (1.30 P.M.), and the Central London Ophthalmic Hospitals operations are performed daily.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

MONDAY (20th).—POST-GRADUATE COLLEGE (West London Hospital' Hammersmith road, W.).—12 noon: Lecture:—Pathological Demonstration. 2 P.M.: Medical and Surgical Clinics. 2.30 P.M.: X Rays. Operations. Diseases of the Eye.

TUESDAY (21st).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—2 P.M.: Medical and Surgical Clinics. Diseases of the Throat, Nose, and Ear. 2.30 P.M.: X Rays. Operations. Diseases of the Skin.

WEDNESDAY (22nd).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—10 A.M.: Diseases of the Throat, Nose, and Ear. Diseases of Children. 2 P.M.: Medical and Surgical Clinics. 2.30 P.M.: X Rays. Operations. 5 P.M.: Lecture:—Practical Demonstration in Cystoscopy.

THURSDAY (23rd).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—2 P.M.: Medical and Surgical Clinics. 2.30 P.M.: X Rays. Operations. Diseases of the Eye.

FRIDAY (24th).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—2 P.M.: Diseases of the Throat, Nose, and Ear. Medical and Surgical Clinics. 2.30 P.M.: X Rays. Operations. Diseases of the Skin.

SATURDAY (25th).—POST-GRADUATE COLLEGE (West London Hospital, Hammersmith-road, W.).—10 A.M.: Diseases of the Throat, Nose, and Ear. 2 P.M.: Medical and Surgical Clinics. 2.30 P.M.: X Rays. Operations.

EDITORIAL NOTICES.

It is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITORS," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this office.

Lectures, original articles, and reports should be written on one side of the paper only, AND WHEN ACCOMPANIED BY BLOCKS IT IS REQUESTED THAT THE NAME OF THE AUTHOR, AND IF POSSIBLE OF THE ARTICLE, SHOULD BE WRITTEN ON THE BLOCKS TO FACILITATE IDENTIFICATION.

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Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale and advertising departments of THE LANCET *should be addressed "To the Manager."*

We cannot undertake to return MSS. not used.

MANAGER'S NOTICES.

THE INDEX TO THE LANCET.

THE Index to Vol. I. of 1906, which was completed with the issue of June 30th, and the Title-page to the Volume, were given in THE LANCET of July 7th.

VOLUMES AND CASES.

VOLUMES for the first half of the year 1906 are now ready. Bound in cloth, gilt lettered, price 18*s.*, carriage extra.

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